

**RECORD OF DECISION  
DECLARATION**

**SITE NAME AND LOCATION**

Hastings Area-Wide Ground Water Action  
CERCLIS ID # NED980862668  
Operable Unit # 19  
Hastings Ground Water Contamination Site  
Hastings, Adams County, Nebraska

**STATEMENT OF BASIS AND PURPOSE**

The U.S. Environmental Protection Agency (EPA) has been investigating sources of ground water contamination in the Hastings area since 1984. Due to the high levels of volatile organic compounds (VOCs) found in three municipal wells, the EPA designated the contaminated area as the Hastings Ground Water Contamination Site (HGWCS).

For investigative and remediation purposes, the HGWCS has been divided into seven subsites, based on geographic and constituent source area characteristics. The seven subsites are the Former Naval Ammunition Depot (NAD), FAR-MAR-CO, North Landfill, Second Street, Colorado Avenue, Well No. 3 and South Landfill. (The NAD is being addressed by the Army Corps of Engineers; the NAD is not part of this Area-Wide Ground Water Action.) The remedy selected in this Record of Decision (ROD) is intended to protect the public from exposure to the contaminated ground water emanating from the six city subsites. This approach, which EPA refers to as the Area-Wide Ground Water Action, integrates the information collected at the city subsites into a comprehensive strategy that evaluates remedies which protect potential receptors from unacceptable risks posed by ground water and provides assurance that the Area-Wide remedy is consistent with the various actions that have already been implemented at the subsites.

EPA's selected remedy in this ROD is Institutional Controls and Related Actions. While this remedy does not achieve all the remedial action objectives or fully satisfy Applicable, Relevant or Appropriate Requirements (ARARs), it is an interim remedy and is considered to be the most protective and implementable alternative available at this time.

This remedy was selected over other alternatives which proposed final subsite cleanups because there is presently insufficient information on certain subsite remedies, making implementation unattainable at this time. Because the effectiveness of on-going subsite actions at four of the six city subsites has not yet been determined, the final remedies for these subsites could not be identified and therefore could not be incorporated as a component of a final Area-Wide remedy.

The selected interim remedy will ensure protection of human health by eliminating the potential for exposure through institutional control actions and other related actions. Implementation

of institutional controls and related actions will continue until the maximum contaminant levels established under the Safe Drinking Water Act (MCLs) or  $1 \times 10^{-6}$  cleanup goals are reached, as prescribed by final subsite RODs.

A final Area-Wide ROD will be issued after final subsite RODs are issued for each of the six subsites. At the appropriate time, the final Area-Wide ROD will, based on data collected, 1) determine that either MCLs or  $1 \times 10^{-6}$  cleanup goals are achievable at each of the subsites or 2) waive the MCL or  $1 \times 10^{-6}$  cleanup goal under Section 121 (d)(4) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), 42 U.S.C. § 9601(d)(4).

This action was chosen in accordance with CERCLA, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. Part 300 *et seq.*, as amended. The Director of the Superfund Division has been delegated the authority to approve this ROD.

This decision is based on the Administrative Record, which has been developed in accordance with Section 113(k) of CERCLA, and is available for review at the Hastings Public Library and at the EPA Region VII Record Center in Kansas City, Kansas. The Administrative Record Index (Appendix C to the ROD) identifies each of the items in the Administrative Record upon which the selection of the remedial action is based.

The EPA is the lead agency for the site, and the Nebraska Department of Environmental Quality (NDEQ) has been designated as the support agency. This interim action ROD is being issued by the EPA.

The state of Nebraska concurs with the selected Area-Wide interim action remedy.

### **ASSESSMENT OF THE SITE**

The response action selected in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

### **EVALUATION OF PAST RESPONSE ACTIONS**

To date, source control and/or ground water response actions have been initiated at the Well No. 3, Colorado Avenue, Second Street, FAR-MAR-CO, and North Landfill subsites. In September 2000, the EPA selected a remedy at the South Landfill, but no action has been implemented yet. The ground water actions at Well No. 3 (plume 1), South Landfill, and FAR-MAR-CO have been designed to contain ground water concentrations that exceed maximum contaminant levels (MCLs) or, where there is no MCL for a contaminant of concern (COC), the  $1 \times 10^{-6}$  (1 in 1,000,000) cumulative excess cancer risk level. The FAR-MAR-CO ground water action may have the effect of containing the North Landfill plume at that level also; results are pending. The ground water

response actions at Second Street and Colorado Avenue have been implemented as removal actions or as interim remedial actions (designed to contain ground water concentrations that exceed  $1 \times 10^{-4}$  [1 in 10,000] cumulative excess cancer risk). An Area-Wide Feasibility Study (FS) was completed in November 2000.

### **DESCRIPTION OF THE SELECTED REMEDY**

The selected interim remedy for the HGWCS Area-Wide Ground Water, as set forth in this ROD, is institutional controls and related actions.

Institutional controls refer to non-engineering measures intended to affect human activities in such a way as to prevent or reduce exposure to hazardous substances. The institutional controls and related actions will include:

- ▶ Domestic ground water use restrictions to prevent the installation of drinking water wells in the contaminated area. The ground water use restrictions would preclude current or future property owners from pumping ground water for domestic use until it is demonstrated through sampling that the ground water is suitable for use. This measure reduces the human exposure pathway to impacted ground water. This would be accomplished through implementation of City Ordinance #3754;
- ▶ Installation of warning signs to advise the public that the water in the area may not meet public drinking water standards (this is likewise a component of City Ordinance #3754);
- ▶ Monitoring compliance with ground water use restrictions to prevent unacceptable exposures (this is also a component of City Ordinance #3754);
- ▶ An inventory of all existing ground water wells to identify all domestic, irrigation, industrial and monitoring wells in the institutional control area (ICA). The inventory will identify users of existing wells who are potentially at risk and wells which will be targeted for future monitoring.
- ▶ Providing an alternate source of water for domestic use to any residences currently relying on private wells within the ICA that are impacted by contamination attributable to the HGWCS. These activities may include funding the hook-up to the city's public water supply system, or providing bottled water and/or an in-house treatment system for the well water.
- ▶ A ground water monitoring program which will include periodic ground water sampling of selected wells identified in the areas of contamination and down gradient from the contamination zones. The monitoring program will be designed to identify the extent of the plumes and down gradient water users who may be at risk. The installation of additional monitoring wells may be required as part of the ground water monitoring system.

- Preparation of an annual report which summarizes the activities occurring under the new ordinance, compiles all the monitoring data collected, evaluates the effectiveness of plume containment measures, evaluates the ordinance for its effectiveness in preventing exposure, and evaluates the need for additional city actions (i.e., additional monitoring wells or alternative water supplies) to control unacceptable exposures.

The estimated cost for the selected remedy includes the cost to implement institutional control actions and other related actions but does not include costs for individual subsite actions which will be implemented under separate subsite RODs.

### **STATUTORY DETERMINATION**

The selected remedy is protective of human health and the environment, and is cost-effective. However, because the selected remedy does not set MCLs as the cleanup goal, it is not considered ARAR-compliant and must be implemented as an interim action, consistent with the 40 C.F.R. 300.430(f)(1)(ii)(C). The EPA will conduct periodic monitoring of ongoing subsite actions to determine progress towards achieving MCLs in accordance with subsite-specific RODs. This interim measure will become part of a final Area-Wide remedial action that will attain ARARs unless a waiver is granted under Section 121(d)(4) of CERCLA.

Because the effectiveness of ongoing subsite actions are currently being evaluated, EPA has determined that final subsite actions could not be selected as part of the Area-Wide remedy. Consequently, the selected remedy does not satisfy the statutory preference for treatment as a principal element of the remedy.

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after initiation of remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

### **DATA CERTIFICATION CHECKLIST**

The following information is included in the Decision Summary section of this ROD. Additional information can be found in the Administrative Record file for this site:

- The contaminants of concern (COCs) and maximum concentrations for the Area-Wide Subsites are summarized below:

COCs	<u>COCs and Maximum Concentrations</u>					
	<i>South Landfill µg/l</i>	<i>Well #3 µg/l</i>	<i>FAR-MAR- CO µg/l</i>	<i>North Landfill µg/l</i>	<i>Second Street µg/l</i>	<i>Colorado Ave µg/l</i>
Benzene	-	-	-	-	25,000	-
CCl <sub>4</sub>	-	1,400	2,800	8	-	1
Chloroform	-	120	19	1,900	52	3.6

**COCs and Maximum Concentrations**

<b>COCs</b>	<b>South Landfill µg/l</b>	<b>Well #3 µg/l</b>	<b>FAR-MAR- CO µg/l</b>	<b>North Landfill µg/l</b>	<b>Second Street µg/l</b>	<b>Colorado Ave µg/l</b>
1,2-DCA	26	110	220	27	1,700	-
1,1-DCA	22	2	220	36	-	360
1,1-DCE	29	150	13	60	-	1,400
Ethyl Benzene	-	-	-	-	19,000	-
Methylene Chloride	-	23	90	150	-	2,200
Styrene	-	-	-	-	12,000	-
PCE	12	200	19	48	530	1,300
TCE	300	990	1,200	2,400	16,000	55,000
Toluene	-	-	-	-	28,000	-
VC	44	-	-	87	-	-
EDB	-	<1	220	8.8	-	-
1,1,1-TCA	11	200	200	99	2,000	2,100
cis 1,2-DCE	340	-	-	650	-	310
trans 1,2-DCE	-	-	41	2,000	-	81
Naphthalene	-	-	-	-	7,900	-
Xylenes	-	-	-	-	11,000	-

- ▶ A baseline risk assessment was prepared by the Nebraska Health and Human Services System for the HGWCS, dated November 1997. This assessment evaluates the potential area-wide risk associated with hypothetical human exposure to residual ground water concentrations after the interim remedial/removal actions have been completed at each of the subsites. The risk determinations are summarized below.

**Summary of Human Health Risk Assessment**

<b>Health Risk</b>	<b>Receptor #1 Well No. 3 Subsite</b>	<b>Receptor #2 Colorado Avenue and Second Street Subsites</b>	<b>Receptor #3 North Landfill and FAR-MAR-CO Subsites</b>	<b>Receptor #4 South Landfill Subsite</b>
Non-Carcinogenic Residential Risk (Hazard Index), Child	14.2	56.3	31.1	3.8
Non-Carcinogenic Residential Risk (Hazard Index), Adult	5.7	22.5	12.9	1.6
Carcinogenic Residential Risk, Child	4.68x10 <sup>-4</sup>	4.31x10 <sup>-4</sup>	7.70x10 <sup>-4</sup>	9.08x10 <sup>-5</sup>
Carcinogenic Residential Risk, Adult	4.68x10 <sup>-4</sup>	8.50x10 <sup>-4</sup>	1.22x10 <sup>-3</sup>	1.74x10 <sup>-4</sup>

- ▶ The selected remedy does not set MCLs as the cleanup goal because there is insufficient information to select final remedies at all subsites. The EPA will conduct periodic monitoring of ongoing subsite actions to determine progress towards achieving MCLs in accordance with subsite-specific RODs. Since the selected remedy does not achieve ARARs, the Area-Wide remedy must be implemented as an interim action, consistent with 40 C.F.R. 300.430(f)(1)(ii)(C).
- ▶ Source materials, constituting principal threat wastes, have been removed from the subsites by prior response action or will be addressed at the subsite level.
- ▶ Land use within the Area-Wide institutional control area is a mixture of industrial, commercial and residential. The EPA assumes current and future land use will remain unchanged. Ground water use will be restricted due to the contamination present. Future ground water will also be restricted in accordance with the selected remedy. Domestic use of the ground water was assumed in both the baseline risk assessment and ROD.
- ▶ The city of Hastings has passed a city ordinance establishing an ICA restricting the use of the ground water within the Area-Wide project area. The selected remedy is designed to protect public health and welfare while ground water remediation is attained through separate subsite actions.
- ▶ The estimated cost of the selected remedy is:

Estimated Capital Cost:	\$267,030
Estimated Annual O&M:	\$34,960/yr
Estimated Present Worth:	\$700,849

- ▶ The following were decisive factors that led to the selected remedy:

Overall protectiveness  
 Compliance with applicable, relevant, and appropriate requirements  
 Long-term effectiveness and permanence  
 Implementability  
 Cost  
 State support and acceptance  
 Community acceptance

## AUTHORIZING SIGNATURES

This ROD documents the selected interim action remedy for the Area-Wide Ground Water Action of the Hastings Ground Water Contamination Site. This remedy was selected by EPA with concurrence of the Nebraska Department of Environmental Quality.

U.S. Environmental Protection Agency

By:

Michael J. Sanderson, Director  
Superfund Division  
Region VII

Date:

06-25-01

Attachments:

Decision Summary  
Responsiveness Summary  
Administrative Record Index

**INTERIM ACTION RECORD OF DECISION**  
**DECISION SUMMARY**  
**HASTINGS GROUND WATER CONTAMINATION SITE**  
**AREA-WIDE GROUND WATER ACTION**  
**OPERABLE UNIT #19**  
**HASTINGS, NEBRASKA**

**Prepared by**  
**U.S. Environmental Protection Agency**

**Region VII**  
**Kansas City, Kansas**

**June 22, 2001**



## **Record of Decision**

### **Decision Summary Contents**

<u>Section</u>	<u>Page</u>
Site Name, Location and Description .....	1
Site History and Enforcement Activities .....	1
Community Participation .....	4
Scope and Role of Response Action .....	4
Site Characteristics and Summary of Prior Actions .....	5
Current and Potential Future Site and Resource Uses .....	16
Summary of Site Risks .....	17
Remedial Action Objectives .....	21
Description of Alternatives .....	22
Comparative Analysis of Alternatives .....	25
Summary of Remedial Criteria Evaluation .....	32
Principal Threat Wastes .....	32
Selected Remedy .....	34
Statutory Determinations .....	34
Documentation of No Significant Changes from Proposed Plan .....	36
State Role .....	37

## **Record of Decision**

### **Decision Summary Contents**

#### **List of Tables:**

1.	Summary of City Subsites and Operable Units .....	15
2.	Summary of Contaminants of Concern and Maximum Concentrations .....	16
3.	Human Health Risk Assessment .....	19
4.	Risk-Based Concentrations and Maximum Contaminant Levels for COCs ....	19
5.	Summary of Selected Chemical Toxicity Data .....	20
6.	Summary of Remedial Action Objectives .....	21
7.	Summary of Subsite Interim and Final Remedial Actions .....	22
8.	Summary of Remedial Alternatives for Ground Water .....	23
9.	Revised Summary of Alternative G-2 Costs .....	29
10.	Revised Summary of Alternative G-3 Costs .....	30
11.	Revised Summary of Alternative G-4 Costs .....	31
12.	Revised Summary of Cost Estimates for Remedial Alternatives .....	32
13.	Comparative Analysis of Alternatives .....	33

#### **List of Figures:**

1.	Site Location Map - Hastings Ground Water Contamination Site .....	2
2.	Site Location Map - Well No. 3 Subsite .....	6
3.	Site Location Map - Colorado Avenue Subsite .....	8
4.	Site Location Map - Second Street Subsite .....	10
5.	Site Location Map - South Landfill Subsite .....	11
6.	Site Location Map - North Landfill Subsite .....	12
7.	Site Location Map - FAR-MAR-CO Subsite .....	14
8.	Potential Sources of Human Exposure .....	18

**DECISION SUMMARY  
INTERIM ACTION RECORD OF DECISION  
AREA-WIDE GROUND WATER ACTION  
HASTINGS GROUND WATER CONTAMINATION SITE  
HASTINGS, NEBRASKA**

**SITE NAME, LOCATION AND DESCRIPTION**

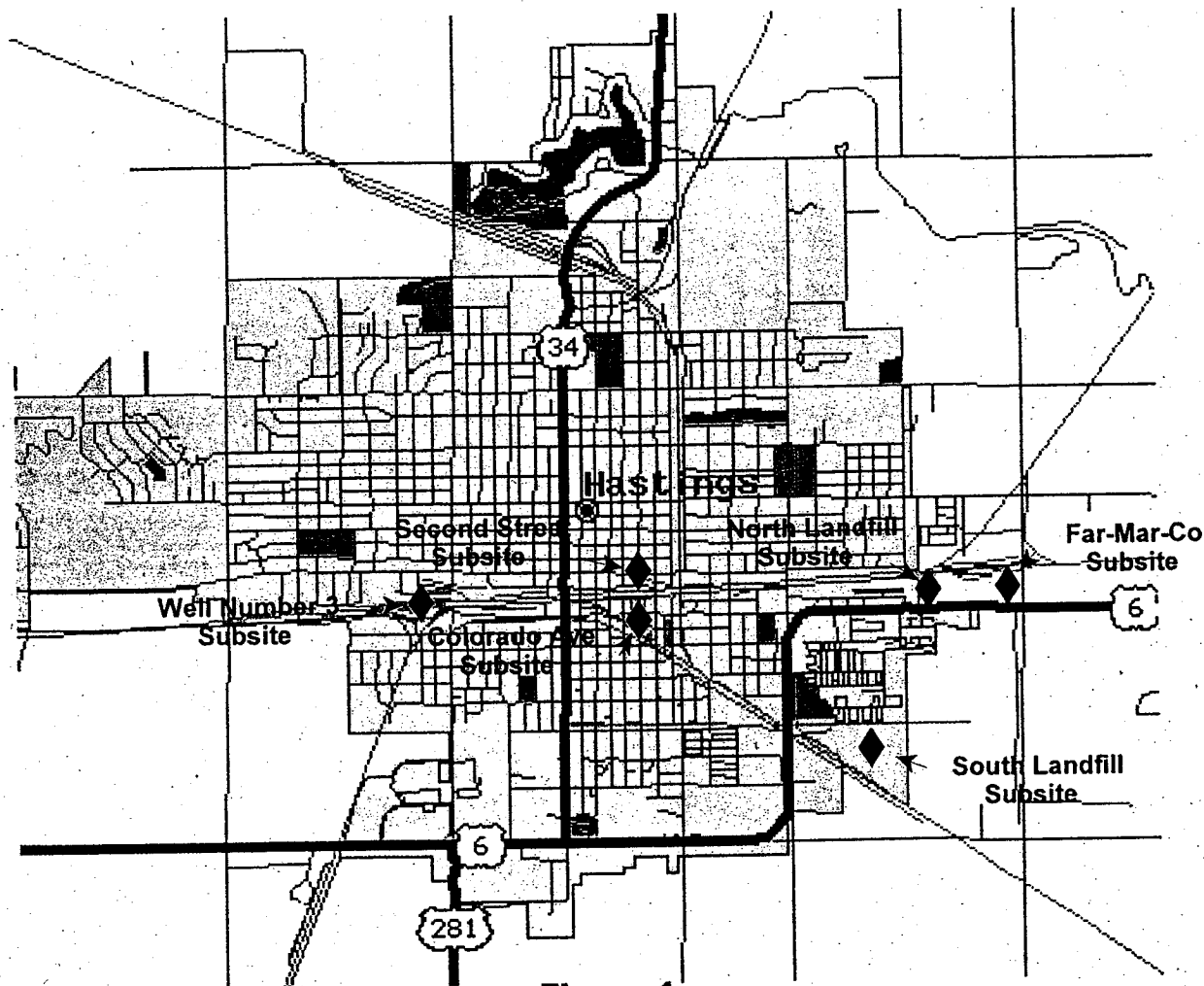
Site Name:	Hastings Area-Wide Ground Water Action Hastings Ground Water Contamination Site
Site Location:	Hastings, Nebraska
CERCLIS ID:	# NED980862668
Operable Unit:	# 19
Lead-Entity:	EPA
Site Type:	Contaminated Ground Water

The EPA has been investigating sources of ground water contamination in the Hastings area since 1984. Due to the high levels of volatile organic compounds (VOCs) found in three municipal wells, the EPA designated the contaminated area as the Hastings Ground Water Contamination site, (HGWCS). The HGWCS covers the central industrial area of the city of Hastings and adjacent areas outside of the city limits. The HGWCS was placed on the National Priorities List (NPL) in 1986. The NPL is a nation-wide list of hazardous waste sites that are eligible for investigation and remediation under the Superfund program.

For investigative and remediation purposes, the HGWCS has been divided into seven subsites, based on geographic and constituent source area characteristics. The seven subsites are the Former Naval Ammunition Depot (NAD), FAR-MAR-CO, North Landfill, Second Street, Colorado Avenue, Well No. 3 and South Landfill (Figure 1). To facilitate the management of investigation and response actions, the seven subsites have been further divided into 20 "Operable Units" (OUs). Clean up of the NAD is being addressed by the Army Corps of Engineers and is not part of this Area-Wide Action. This Record of Decision (ROD) addresses the remaining city subsites. This document summarizes the development, screening, and the detailed evaluation of alternative ground water remedial actions which need to be taken to prevent exposure to contaminated ground water.

**SITE HISTORY AND ENFORCEMENT ACTIONS**

To date, source control and/or ground water response actions have been initiated at Well No. 3, Colorado Avenue, Second Street, FAR-MAR-CO, and North Landfill. In September 2000, the EPA selected a remedy at the South Landfill, but no action has been implemented yet. The ground water actions at Well No. 3 (plume 1), South Landfill, and FAR-MAR-CO have been designed to contain ground water concentrations that exceed the maximum contaminant levels established under the Safe Drinking Water Act (MCLs) or, where there is no MCL for a contaminant of concern (COC), the  $1 \times 10^{-6}$  (1 in 1,000,000) cumulative excess cancer risk level. The FAR-MAR-CO ground water action may have the effect of containing the North Landfill plume at that level also;



**Figure 1**  
**Site Location Map**  
**Hastings, Nebraska**

results are pending. The ground water response actions at Second Street and Colorado Avenue have been implemented as removal actions or as interim remedial actions (designed to contain ground water concentrations that exceed  $1 \times 10^{-4}$  [1 in 10,000] cumulative excess cancer risk).

An Area-Wide Feasibility Study (FS) was completed in November 2000. Its purpose was to integrate the information collected at each of the city subsites into a comprehensive document that evaluates remedies which protect potential receptors from unacceptable risks posed by ground water. The Area-Wide FS evaluated environmental conditions as well as proposed, active, and completed remedial measures on a site-wide basis, to ensure that the Area-Wide remedy is consistent with the various actions that have already been implemented at the subsites.

Potentially Responsible Parties (PRPs) are those entities liable under Comprehensive Environmental Response, Compensation and Liability Act, as amended, 42 U.S.C. §9601 *et seq.* (CERCLA) for the costs incurred by the EPA for investigation and cleanup of contamination at a Superfund site. EPA has entered into Administrative Orders on Consent and Consent Decrees at the North Landfill, Well #3, and FAR-MAR-CO Subsites and has issued unilateral administrative orders to the PRPs at the Colorado Avenue Subsite. These agreements and orders have required PRPs to perform work and pay response costs at the subsites. Since the Area-Wide action is related to the contamination emanating from any of the subsites, the Area-Wide PRPs are those entities who were named as PRPs at any of the subsites. EPA identified 10 such PRPs and issued them each a demand for Area-Wide costs on November 18, 1997. These PRPs received prior notice of potential liability as follows:

- ▶ General notice letter to Dravo Corporation (Dravo) in connection with the North Landfill and South Landfill Subsites on September 23, 1985. General notice letter in connection with the Colorado Avenue Subsite on December 19, 1986.
- ▶ General notice letter to Marshalltown Instruments, a division of Desco Corporation, in connection with the Colorado Avenue Subsite, on December 19, 1986.
- ▶ General notice letter to Eric Inc. in connection with the Colorado Avenue Subsite, on June 22, 1994.
- ▶ General notice letter to Dutton-Lainson Company in connection with the North Landfill and South Landfill Subsites on December 12, 1986 and in connection with the Well #3 Subsite on November 5, 1992.
- ▶ General notice letter to the city of Hastings (City) in connection with the North Landfill and South Landfill Subsites on December 12, 1986 and in connection with the Second Street Subsite on September 23, 1985.
- ▶ General notice letter to Farmland Industries, Inc. (Farmland) in connection with the FAR-MAR-CO Subsite on December 19, 1986.
- ▶ General notice letter to Morrison-Quirk Grain Corporation (Morrison Enterprises or Morrison) on December 19, 1986.
- ▶ General notice letter to the U.S. Navy in connection with the North Landfill on September 23, 1985.
- ▶ General notice letter to Cooperative Producers Inc. (CPI) in connection with the FAR-MAR-CO Subsite on February 3, 1990.
- ▶ General notice letter to Concrete Industries, Inc. in connection with the South Landfill Subsite on September 23, 1985.

In addition to issuing these notice letters, on October 23, 1998, EPA entered into an Administrative Order on Consent with the City, Dutton-Lainson, Dravo, Marshalltown, Eric and the U.S. Navy to perform the Feasibility Study for the Area-Wide action.

### **COMMUNITY PARTICIPATION**

Community relations activities for the HGWCS were initiated by EPA in 1984. Early community relations activities included meeting with city and state officials to discuss the site (December 1984), conducting interviews with local officials and interested residents (February 1985), establishing an information repository (February 1985), and preparing a Community Relations Plan (October 1985). Since December of 1984, EPA has conducted periodic meetings with Hastings city officials to update them regarding site work, investigation findings, and to hear the city's concerns about the project. The Community Relations Plan was revised in January 1988 and again in January 1990 to reflect new community concerns and site activities.

Information on the site, in the form of fact sheets, has been mailed to public officials, Hastings' businesses, and numerous citizens. EPA held a public comment period from February 14, 2001, to April 15, 2001, following the release of the Proposed Plan in February. The Proposed Plan identified the preferred alternative to mitigate the contamination at the site. On March 1, 2001, EPA held a public meeting to discuss the preferred alternative for the site and to receive citizens' comments and questions. Agency responses to comments received during the public comment period are included in the Responsiveness Summary attached to this Decision Summary.

### **SCOPE AND ROLE OF RESPONSE ACTION**

This ROD addresses activities which will mitigate, through institutional controls and related actions, the threat from contaminated ground water emanating from the six city subsites. Institutional controls refer to non-engineering measures intended to affect human activities in such a way as to prevent or reduce exposure to hazardous substances. The institutional controls and related actions include:

- ▶ Domestic ground water use restrictions to prevent the installation of drinking water wells in the contaminated area. The ground water use restrictions would preclude current or future property owners from pumping ground water for domestic use until it is demonstrated through sampling that the ground water is suitable for use. This measure reduces the human exposure pathway to impacted ground water. This would be accomplished through implementation of City Ordinance #3754;
- ▶ Installation of warning signs to advise the public that the water in the area may not meet public drinking water standards (this is likewise a component of City Ordinance #3754);
- ▶ Monitoring compliance with ground water use restrictions to prevent unacceptable exposures (this is also a component of City Ordinance #3754);

- ▶ An inventory of all existing ground water wells to identify all domestic, irrigation, industrial and monitoring wells in the institutional control area (ICA). The inventory will identify users of existing wells who are potentially at risk and which will be targeted for future monitoring;
- ▶ Providing an alternate source of water for domestic use to any residences currently relying on private wells within the ICA that are impacted by contamination attributable to the HGWCS. These activities may include funding the hook-up to the city's public water supply system, or providing bottled water and/or an in-house treatment system for the well water;
- ▶ A ground water monitoring program which will include periodic ground water sampling of selected wells identified in the areas of contamination and down gradient from the contamination zones. The monitoring program will be designed to identify the extent of the plumes and down gradient water users who may be at risk. The installation of additional monitoring wells may be required as part of the ground water monitoring system;
- ▶ Preparation of an annual report which summarizes the activities occurring under the new ordinance, compiles all the monitoring data collected, evaluates the effectiveness of plume containment measures, evaluates the ordinance for its effectiveness in preventing exposure, and evaluates the need for additional city actions (i.e., additional monitoring wells or alternative water supplies) to control unacceptable exposures.

This ROD is consistent, to the extent practicable, with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). In accordance with the NCP, the action for the Site will complement and be consistent, to the extent possible, with response actions underway, or planned, at the other HGWCS subsites.

The final action to be conducted at the HGWCS (including all subsites individually, either as separate subsite actions or as part of a final Area-Wide Remedy), will have a common goal to contain and remove contaminants in the ground water and reduce cancer risk levels to correspond to no more than an estimated one additional cancer case in a population of 1,000,000 based on an assumed 30-year exposure period. The goals for planned subsite actions will be to achieve safe drinking water levels (as defined by either the MCLs or  $1 \times 10^{-6}$  excess cancer risk levels) and to prevent further ground water quality degradation by eliminating further leaching of contaminants into the ground water via source control actions.

Private wells in the area of the site will be sampled on a periodic basis to ensure that human exposure to contaminated ground water is not occurring. However, unrestricted use of contaminated water, (though it is not known to be occurring), would pose an immediate threat to human health. Data in the Remedial Investigation (RI) Report indicate that further remedial action is appropriate to prevent unacceptable risk to human health until all subsites are fully remediated.

## **SITE CHARACTERISTICS**

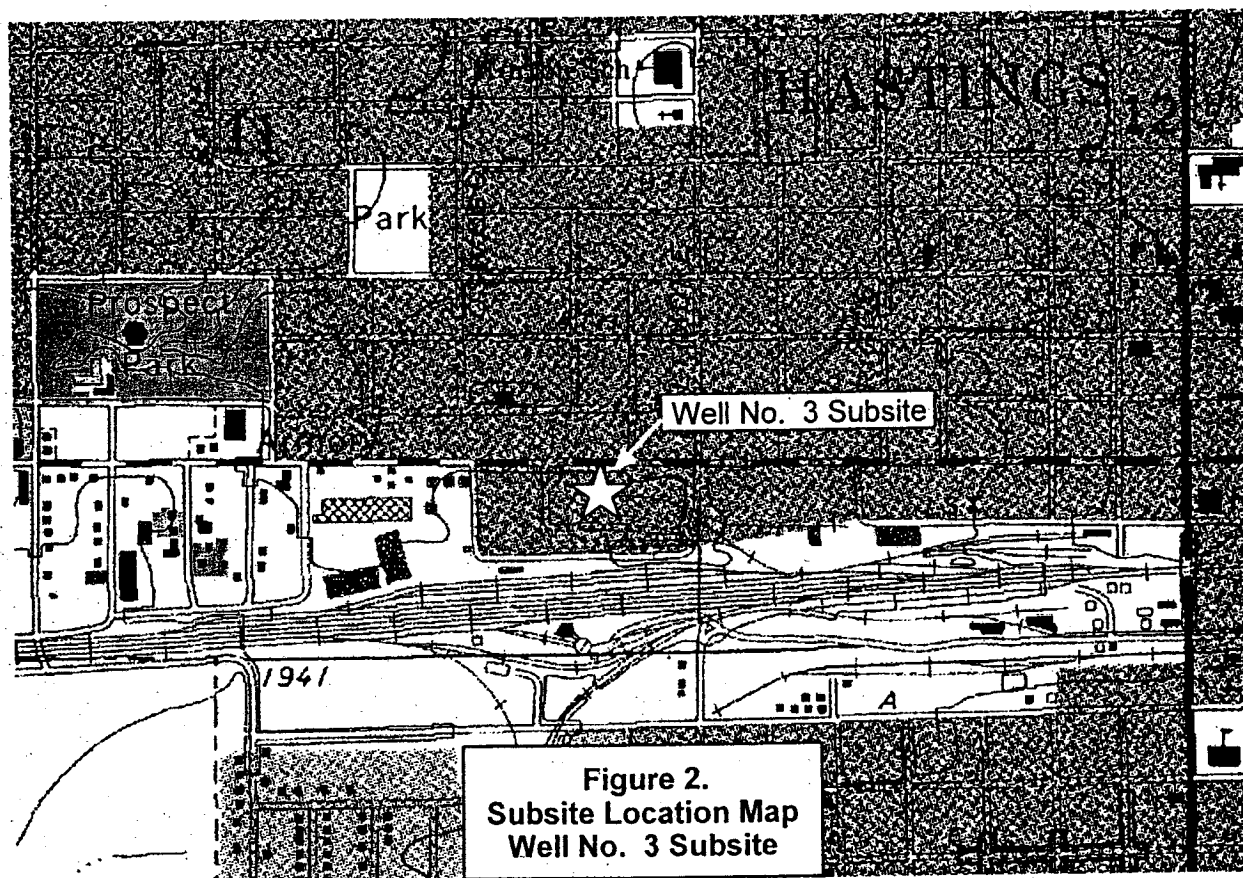
The "Area-Wide Remedial Investigation Report for Hastings Ground Water Contamination Site, Hastings, Nebraska", dated December 1996, the "Area-Wide Feasibility Study, Hastings

*Ground Water Contamination Site, Hastings, Nebraska*", dated April 2000, and the "Area-Wide Feasibility Study Addendum, Hastings Ground Water Contamination Site, Hastings, Nebraska", dated November 2000, contain detailed information regarding prior site investigation activities and evaluations. The significant findings are summarized below.

### Well No. 3 Subsite

The Well No. 3 Subsite is located in the central area of Hastings, approximately one mile west of downtown as shown in Figures 1 and 2. Preliminary investigations focused on carbon tetrachloride ( $\text{CCl}_4$ ) contamination which resulted from spills of grain fumigants at a storage facility operating from 1959 to 1975. Trichloroethylene (TCE), perchloroethylene (PCE or tetrachloroethylene), 1,1,1-trichloroethane (1,1-TCA), and 1,1-dichloroethene (1,1-DCE) were identified in ground water during the  $\text{CCl}_4$  investigations. It is believed that the contaminant source is from one or more manufacturing/degreasing operations. The  $\text{CCl}_4$  plume is referred to as Plume 1 (OU 7 and OU 13) of the Well No. 3 Subsite, while the TCE plume is described as Plume 2 (OU 17 and OU 18).

Well No. 3 Subsite - OU 7 and OU 13: A ROD for the  $\text{CCl}_4$  source control operable unit (OU 7) was issued in September of 1989, specifying soil vapor extraction (SVE) as the remedy for the interim action. The SVE action was implemented in 1992-1993. On June 30, 1993, the EPA





issued a ROD for OU 13, the CCl<sub>4</sub> plume, and OU 18, the TCE plume. The portion of the ROD addressing OU 13 selected extraction and treatment using granular activated carbon (GAC). In December 1994, the EPA modified the ROD to change the treatment technology from GAC to air stripping.

In June 1995, the EPA began the operation of the extraction system. In July 1996, the EPA again changed the treatment technology to use an existing municipal supply well as an extraction well and reuse the extracted ground water as irrigation water for Lincoln Park. Also in 1996, the city of Hastings began to receive federal assistance to maintain and perform quarterly monitoring of the remedial systems for this OU.

By 1999, quarterly monitoring data indicated that MCLs were close to being achieved throughout the subsite. In November 1999 EPA amended the 1993 ROD for OU 13, by setting the remediation goals for the CCl<sub>4</sub> plume at the MCL.

The March 2000 sampling indicated that the levels of CCl<sub>4</sub> attained MCLs within the area of influence of the system. The city and the EPA will continue to sample and monitor the levels of contamination to determine if the contamination remains below the MCLs for CCl<sub>4</sub>.

During the summer of 2000, the city of Hastings began site restoration activities by initiating abandonment of three monitoring wells and removing equipment at another. Additional monitoring and well abandonment will take place after quarterly sampling verifies the attainment of the MCLs within the boundaries of the subsite.

Well #3 Subsite - OU 17 and OU 18: In 1991, the EPA discovered a second plume of contamination (Plume 2) where TCE, PCE, 1,1,1-TCA, and 1,1-DCE were found. The EPA identified two operable units for Plume 2.

OU 17 was identified as the source control operable unit and OU 18 was identified as the ground water operable unit. Plume 2 ground water was addressed in the EPA's 1993 ROD where extraction and treatment using GAC was selected as the ground water remedy.

In January 1994, the EPA and the Dutton-Lainson Company entered into an Administrative Order on Consent (AOC) which required Dutton-Lainson to conduct a soil-gas investigation of its property to determine if a source for the Plume 2 contaminants was present.

EPA performed an Engineering Evaluation/ Cost Analysis for the source control OU 17 and on July 20, 1995, EPA issued its Action Memorandum, selecting SVE to address the contamination present in the soils. Quarterly ground water sampling was also authorized to determine if the removal action would affect the levels of volatile contamination within the ground water.

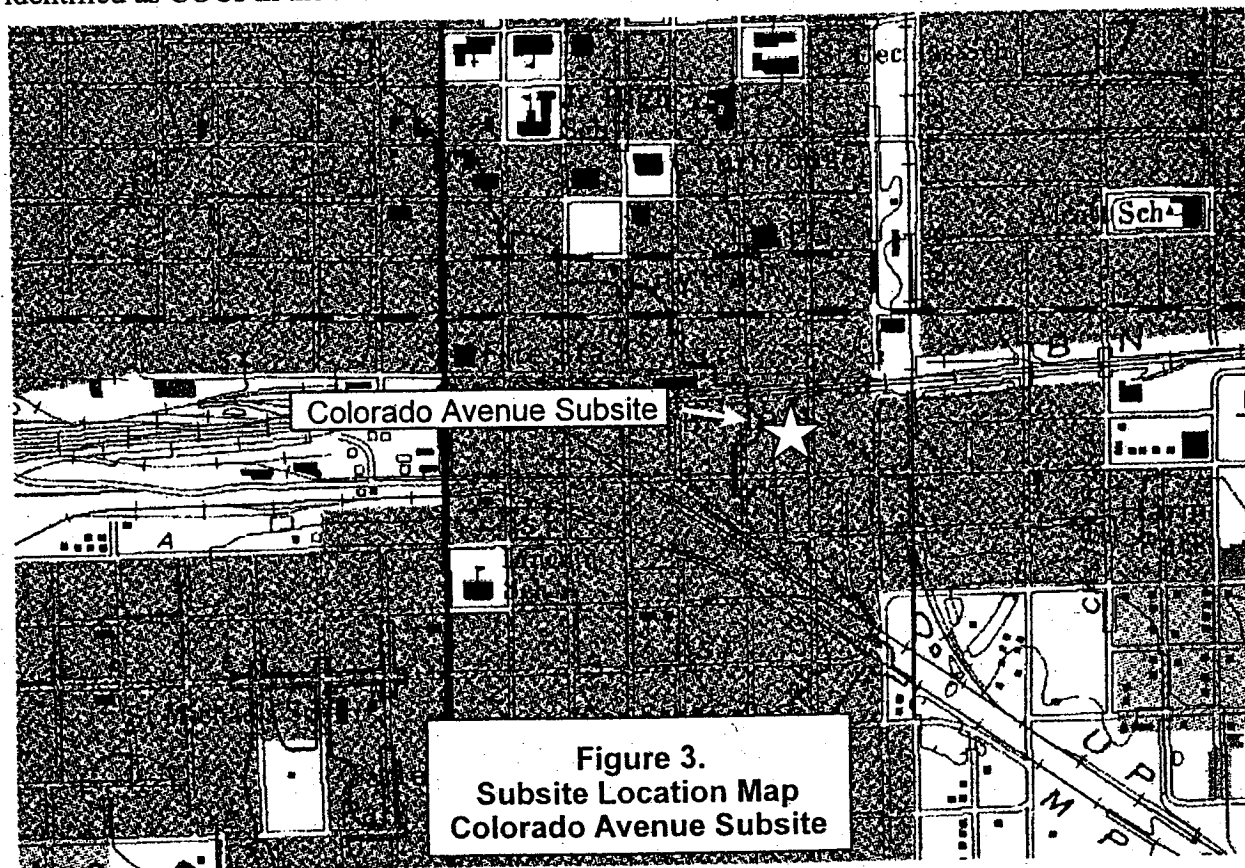
In September 1995, the EPA and Dutton-Lainson entered into an AOC for the implementation of the removal action. By April 1997, the SVE system had attained the removal action goals for remediation of the soils. Dutton-Lainson continued to operate the SVE system to

determine if the extended operational period would reduce the contamination present in the aquifer. Quarterly ground water monitoring was conducted during this period. The operation of the SVE system was terminated in June 1998. By September 1999, the EPA and NDEQ determined that no additional response action was needed for OU 17. Dutton-Lainson proceeded with the abandonment of the extraction and monitoring wells. The EPA determined that the removal action was complete in December 1999.

Dutton-Lainson continues to conduct quarterly ground water sampling. The analytical results show that the level of the Plume 2 contaminants remain below the action level as stated in EPA's 1993 ROD. In May 2000, the EPA reevaluated its decision set forth in the 1993 ROD for Plume 2 (OU 18) and selected the continued operation of the system installed in the former municipal supply well, M-3, until MCLs are attained and verified.

### Colorado Avenue Subsite

The Colorado Avenue Subsite is located in the central-industrialized area of Hastings, as shown in Figures 1 and 3. Ground water impacts were discovered in 1983 when the City attempted to put an inactive municipal well, located about ½ mile east of the source area, back into service. NDEQ analyzed samples from this well in 1983 and 1984 and found elevated concentrations of chlorinated organics, including common degreasing solvents and their related daughter products. TCA (120-133 micro-grams per liter [ $\mu\text{g/l}$ ]), TCE (1620-2000  $\mu\text{g/l}$ ) and PCE, (53-60  $\mu\text{g/l}$ ) were identified as COCs in the ROD.



In addition to chlorinated solvents, many other compounds have been detected although less frequently, or in fewer wells, or at low concentrations. These compounds, also considered COCs, include bromodichloromethane, ethylene dibromide (EDB), chloromethane, chloroethane,  $\text{CCl}_4$ , and chloroform.

In 1988, EPA selected soil vapor extraction (SVE) as the remedy for the initial source control OU (OU 9) to address soil contamination at the subsite. SVE was initiated in 1996 and is ongoing. In 1991, the EPA selected extraction and treatment for the interim ground water remedial action (OU 1). In 1999, the EPA changed the OU 1 remedy to include air sparging and in-well stripping. In addition, the remedy could include monitored natural attenuation. This ground water interim action has not yet been fully implemented. Three air sparging wells were installed at Minnesota Ave.. These wells will utilize the SVE system to capture volatile chemicals released from the ground water, but are not currently operating. The second phase of the interim action involved the installation of three *in situ* aeration wells. These systems are located at Pine Street and north of East Park Street near Cedar Street. The wells have been in operation since December 1999. The phase I and II treatment systems were designed to treat the most contaminated areas of the ground water contaminant plume.

The phase III system is currently in design and will be installed down gradient at the west property boundary for the North Landfill Subsite. The intent of the ground water interim action is to capture and treat the area of the plume where the concentration of contaminants exceeds the  $1 \times 10^{-4}$  excess cancer risk level.

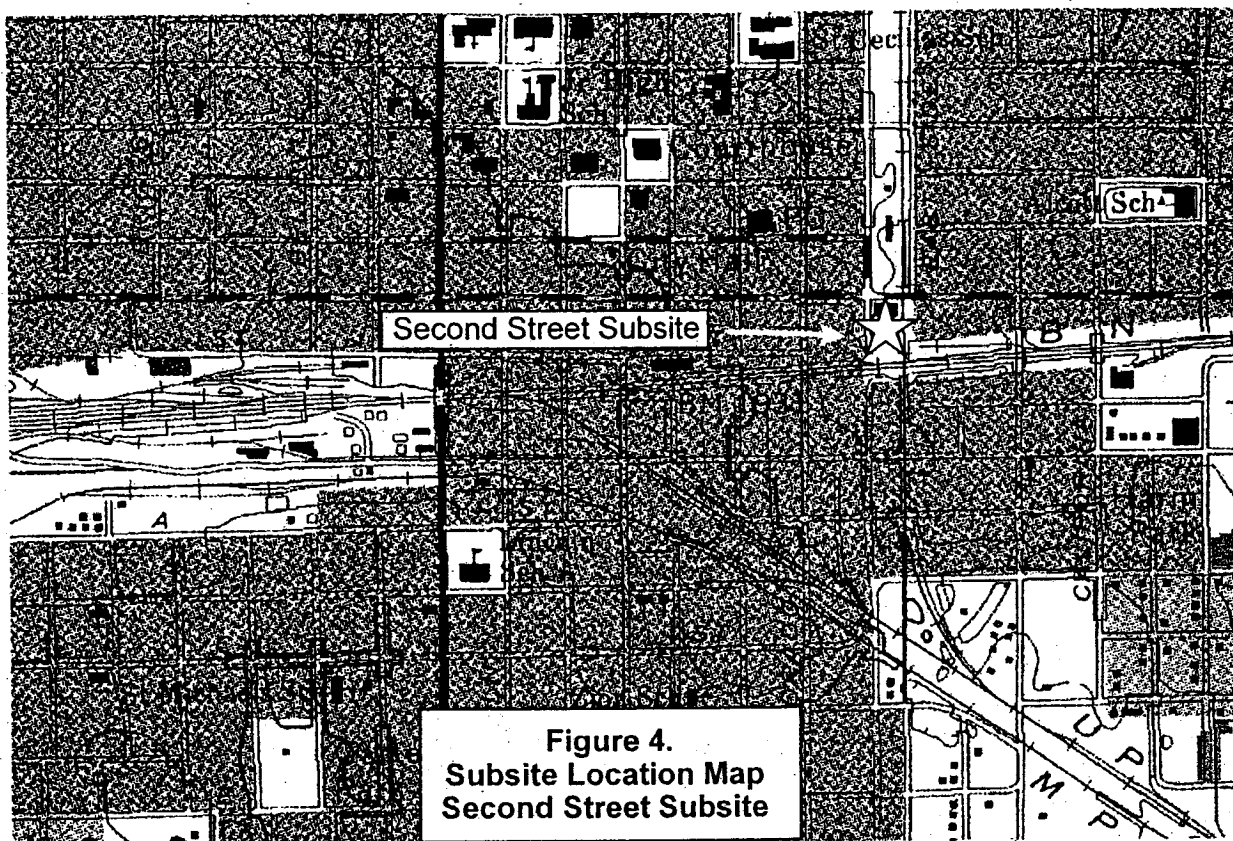
## • Second Street Subsite

The Second Street Subsite is located in the central business district of Hastings as shown in Figures 1 and 4. The subsite source area is the site of a former manufactured gas plant.

In September 1931, manufactured gas processing ceased at the subsite. In 1942, the property was purchased by the city of Hastings. The structures and tanks were demolished and much of the debris was placed in on-site below-grade cisterns and building basements. Another source contributing to the ground water conditions east of the subsite is the Foote Oil Company site.

Investigations have identified the following COCs for ground water at the subsite: benzene, toluene, ethyl benzene, total xylenes, (collectively referred to as BTEX), styrene, TCE, acenaphthene, acenaphthylene, fluorene, 2-methylnaphthalene, naphthalene, and phenanthrene. Investigations resulting from leaking underground storage tanks at the Foote Oil Company site have identified free product (gasoline) and dissolved BTEX in the ground water. Leaking tanks and the associated piping were replaced in 1990. (Part of the Foote Oil contamination is being addressed by the Leaking Underground Storage Tank program.)

The first removal Action Memorandum was signed by EPA in September 1995. The removal action authorized by the Action Memorandum employs both SVE and ground water pump and treat technologies. The SVE treatment system has operated continuously since system startup in January



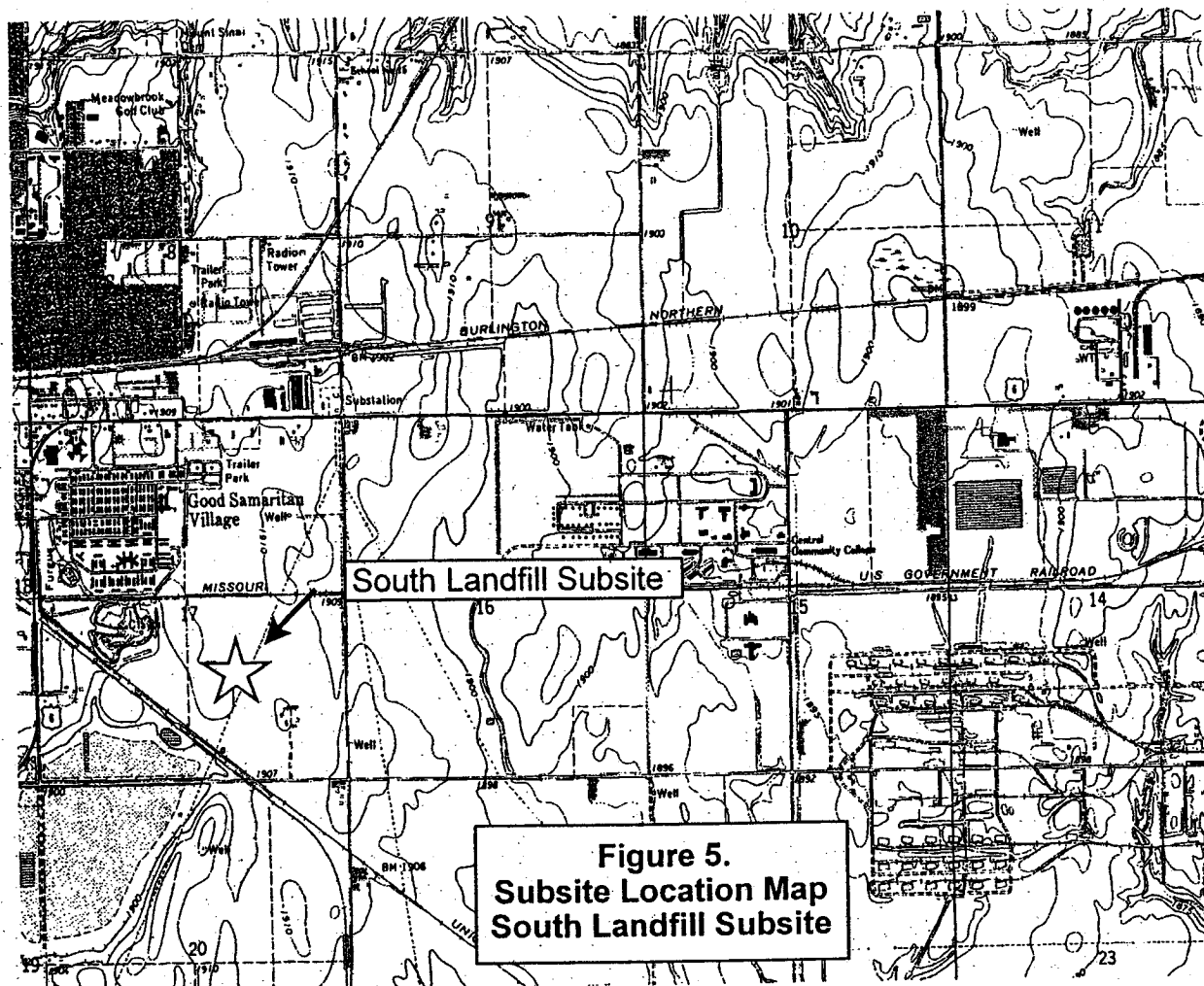
1997. After startup it was determined that oil was entering the ground water treatment system. Subsequently, after installation of an oil/water separator, the ground water pump and treat system has operated since July 1998. The treatment system typically processes approximately 7 million gallons of water per year. This action is referred to as OU 12.

In September 1999, the EPA completed an Action Memorandum to authorize a second removal action. The scope of the second removal action requires two *in situ* treatment wells to be connected to an in-well aeration system and a catalytic oxidizer to treat air emissions produced by the process. The second removal action (#2) is referred to as OU 20.

During 2001, the EPA plans to prepare a FS to analyze remedial action alternatives for the ground water contaminant plume (OU 20). A ROD will be prepared to define the subsite remedies to address the ground water contamination emanating from the subsite at a risk level equivalent to  $1 \times 10^{-4}$ . The EPA envisions that ongoing removal activities will likely continue and become a part of the subsite remedy.

### South Landfill Subsite

The South Landfill Subsite is located southeast of the central business district of Hastings as shown in Figures 1 and 5. The subsite is bounded by the abandoned Union Pacific Railroad right-of-way tracks on the south, the Good Samaritan Village retirement complex on the north, and US



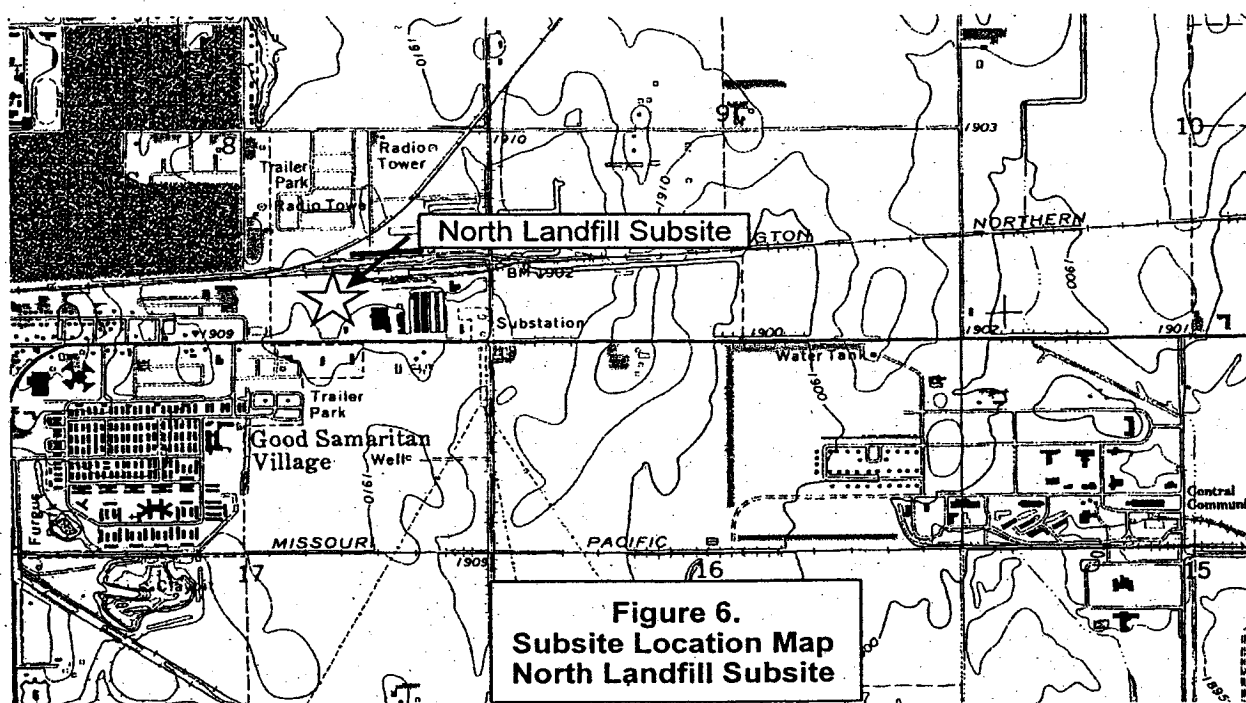
Highway 6 on the west. The South Landfill was originally a clay pit. Mining ceased in the 1950s, and the pit was then abandoned. The South Landfill was later operated as a municipal landfill by the city of Hastings from the early 1960s to the early 1980s.

Subsurface investigations performed by the EPA beginning in the 1980s have identified the following COCs: 1,1-DCA, 1,1-DCE, cis-1,2-DCE, TCA, TCE, PCE, VC, and benzene. TCE had the highest reported concentrations with 300 and 292 µg/l in on-site monitoring wells.

Final cleanup goals of MCLs at South Landfill will be achieved through the subsite remedial action (landfill cap and monitored natural attenuation) based on the September 2000 ROD.

#### North Landfill Subsite

The North Landfill Subsite is located east of the Hastings city limits, as shown on Figures 1 and 6. The North Landfill is situated on land that was formerly used as a clay source for local brick makers. From August of 1961 through 1964, the city of Hastings leased the property and operated a landfill there under state permit.



Investigations at the subsite began in 1984, after the initial Nebraska Department of Health (NDOH) and NDEQ Hastings city-wide sampling of 1983 discovered ground water contamination at other subsites. An RI was completed by the city of Hastings in January 1991 and amended by the EPA in February. A ROD for both the ground water (OU 2) and soil (OU 10) was issued in September 1991.

The EPA approved the remedial design for the North Landfill source control, a landfill cap, in 1995. The city of Hastings completed construction of the cap in 1999. The city of Hastings has been conducting quarterly vadose sampling since 1999 and will continue through 2001.

The ROD for the ground water OU listed 1,1-DCE, 1,2-DCE, VC, TCE, TCA, PCE, and benzene as COCs for the North Landfill. All were detected at or near the subsite from May 1985 to September 1990. The compound 1,2-DCE was detected at a lesser frequency but usually in the same wells as those having TCE. Sampling results indicate a general trend of decreasing TCE concentrations with time at the source area (MW-06) from a maximum concentration of 2,300 ug/l in March 1988 to levels less than 50 ug/l in 2000.

The remedial design for the ground water interim action, OU 2, was suspended to allow time to determine if the FAR-MAR-CO ground water remediation system was addressing the contamination from the North Landfill Subsite. The EPA agreed to allow the North Landfill PRPs five years to demonstrate with ground water data that the North Landfill plume is being remediated by the FAR-MAR-CO system. The five-year period will expire in 2002. If the contamination is not being addressed, the PRPs will be required to complete the design for a ground water remediation system and then implement it.

For the North Landfill Subsite, MCLs will be achieved under a subsite-specific ROD to be issued following the evaluation of the FAR-MAR-CO Subsite action. There are no costs associated with achieving interim cleanup levels (i.e.,  $1 \times 10^{-4}$ ).

### **FAR-MAR-CO Subsite**

The FAR-MAR-CO Subsite is located east of the Hastings city limits in an industrial enterprise zone served by the Burlington Northern Railroad, as shown in Figures 1 and 7.

The subsite consists of industrial properties on about 70 acres having three owners in the recent past: Morrison-Quirk Grain Corporation, from 1953 to 1975; Farmland Industries, Inc. from 1975 to 1991; and Cooperative Producers, Inc. since 1991. Primary structures at the subsite include grain elevators and buildings associated with grain storage that were constructed by Morrison-Quirk in the 1950s. The grain elevator complex was expanded significantly in about 1963.

In 1983, VOCs were first detected in the Community Municipal Services, Inc. water distribution system east of the subsite. TCE and  $\text{CCl}_4$  were detected in two wells which fed the system. When NDOH and NDEQ conducted a followup investigation of ground water contamination at Hastings in 1984, EDB, a grain fumigant, was detected in one well at  $1.7 \mu\text{g/l}$ . This later resulted in the wells being taken out of service. Subsequent investigations performed at the subsite during the last 10 years by the EPA and others have found two separate areas of contamination at the FAR-MAR-CO Subsite.

The  $\text{CCl}_4$  and EDB contamination has been attributed to spills of liquid grain fumigant. The highest levels of contamination are associated with releases that occurred during a grain dust explosion when a liquid grain fumigant tank ruptured and other leaks and spills of the liquid grain fumigant that occurred over the 20 years that the liquid grain fumigant was being used.

*FAR-MAR-CO Subsite - OU 03:* A ROD for source control of  $\text{CCl}_4$ - and EDB-contaminated soils (OU 3) was issued in 1988 selecting SVE. SVE was initiated in 1998 and is still operating. In August 1995, the EPA modified the ROD by extending the SVE operation for two years beyond the time which the soils had reached their cleanup levels. This extension was implemented to address the contamination present in the upper zone of the aquifer and thereby facilitate the cleanup of the aquifer. The work is being conducted by Farmland Industries, Inc. under a judicial Consent Decree. The SVE system began its operation on November 19, 1997. Extended operation and maintenance (O&M) of the system began in June 2000 and is scheduled for completion in June 2002.

*FAR-MAR-CO Subsite - OU 06:* In November 1991, the EPA and Morrison Enterprises entered into an AOC to complete a RI/FS. The Order was modified in September 1995 so that the EPA could proceed under its removal authority instead of its remedial authority. In December 1995, the EPA released an Action Memorandum which authorized a ground water removal action. In June 1996, Morrison Enterprises entered into an AOC with the EPA to perform the ground water removal action authorized in the Action Memorandum. The removal action consisted of installing a well to provide for down gradient containment of TCE, EDB, and  $\text{CCl}_4$ . In July 1997, the ground water extraction



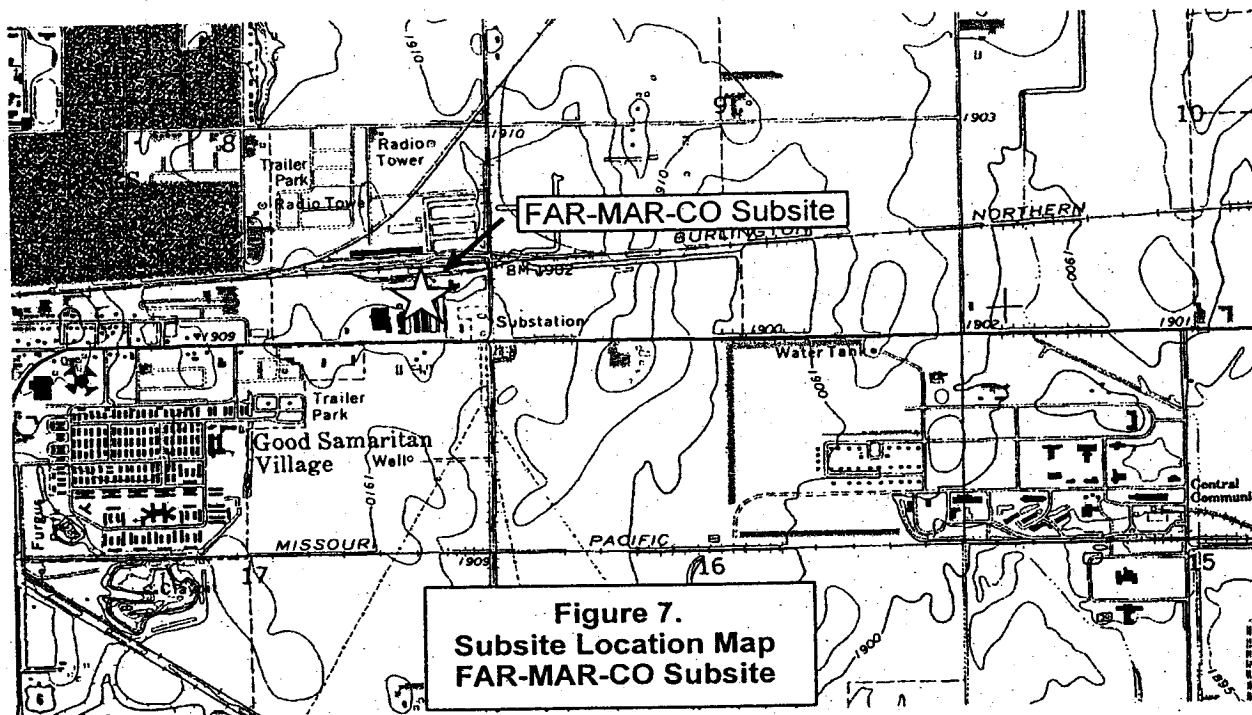


Figure 7.  
Subsite Location Map  
FAR-MAR-CO Subsite

and treatment system was initiated. Ground water recovery via Well "D" and other industrial wells is in place at this subsite. Discharge waters are being pumped to Hastings Energy Center for use as non-contact cooling water. Quarterly ground water monitoring is being conducted by Morrison Enterprises. This removal action will be converted to a remedial action at some point in the future.

Future work includes the continued operation of Well D and several industrial wells, quarterly ground water sampling, maintenance of all equipment necessary to operate and monitor the Well D system, and an evaluation of the influence of Well D on the contamination present within the aquifer down gradient from both of the subsites. Containment of these plumes may be influenced by the operation of the industrial wells down gradient from the subsites. The MCLs for  $\text{CCl}_4$ , EDB, and TCE were selected as the removal action cleanup goals.

#### FAR-MAR-CO Subsite - OU 11:

In 1968, one group of buildings south of the grain elevators was converted to manufacturing use and is currently used by the Hastings Irrigation Pipe Company (HIPCO). In an area around HIPCO, disposal of 1,1,1-TCA occurred over a number of years. In 1992, HIPCO, acting under an EPA Order, removed 43 cubic yards of soils contaminated with 1,1,1-TCA. No further action, other than ground water monitoring, was required by the EPA to address any TCA contamination after the removal action was completed.

Table 1 summarizes the COCs and sources of contamination associated with the six city subsites. Table 2 summarizes the maximum concentrations detected.



**Table 1. Summary of City Subsites and Operable Units  
of the Hastings Ground Water Contamination Site**

Operable Unit	Description	Contaminants of Concern	Probable Origin
<i>Well No. 3 Subsite</i>			
OU 07	Plume No. 1 - Source Area Soils	CCl <sub>4</sub>	grain fumigant spills
OU 13	Ground Water Plume No. 1	CCl <sub>4</sub>	OU 7 vadose zone contamination
OU 17	Plume No. 2 - Source Area Soils	TCE, PCE, 1,1,1-TCA, 1,1-DCE	degreasing and/or dry cleaning
OU 18	Ground Water Plume No.2	TCE, PCE, 1,1,1-TCA, 1,1-DCE	OU 17 vadose zone contamination
<i>Colorado Avenue Subsite</i>			
OU 01	Source Area Soils	TCE	degreasing operations
OU 09	Ground Water Plume	PCE, TCE, 1,1,1-TCA, 1,1,2-TCA	OU 01 vadose zone contamination
<i>Second Street Subsite</i>			
OU 12	Source Area Soils and Ground Water	BTEX and PAHs	manufactured gas operations/disposal and vadose zone contamination
OU 20	Off-Site Ground Water	BTEX and PAHs	OU 12 vadose zone contamination
<i>North Landfill Subsite</i>			
OU 10	Source Area Soils	VC, TCE, cis-1,2-DCE	industrial waste disposal
OU 02	Ground Water Plume	VC, TCE, cis-1,2-DCE	OU 10 vadose zone contamination
<i>South Landfill Subsite</i>			
OU 05	Source Area Soils and Ground Water Plume	VC, TCE, 1,1-DCE, cis-1,2-DCE	industrial waste disposal and vadose zone contamination
<i>FAR-MAR-CO Subsite</i>			
OU 03	Source Area Soils	CCl <sub>4</sub> , EDB	grain fumigant spills
OU 06	Ground Water Plume	CCl <sub>4</sub> , EDB	OU 03 and OU 11 vadose zone contamination
OU 11	Source Area Soils	1,1,1-TCA, 1,1,2-TCA	manufacturing operations/waste disposal
<i>Area-Wide OU</i>			
OU 19	Area-Wide Ground Water Remedy	see above contaminants	see above sources

<b>Contaminants of Concern</b>	<b>South Landfill µg/l</b>	<b>Well #3 µg/l</b>	<b>FAR-MAR-CO µg/l</b>	<b>North Landfill µg/l</b>	<b>Second Street µg/l</b>	<b>Colorado Ave µg/l</b>
Benzene	-	-	-	-	25,000	-
CCl <sub>4</sub>	-	1,400	2,800	8	-	1
Chloroform	-	120	19	1,900	52	3.6
1,2-DCA	26	110	220	27	1,700	-
1,1-DCA	22	2	220	36	-	360
1,1-DCE	29	150	13	60	-	1,400
Ethyl Benzene	-	-	-	-	19,000	-
Methylene Chloride	-	23	90	150	-	2,200
Styrene	-	-	-	-	12,000	-
PCE	12	200	19	48	530	1,300
TCE	300	990	1,200	2,400	16,000	55,000
Toluene	-	-	-	-	28,000	-
VC	44	-	-	87	-	-
EDB	-	<1	220	8.8	-	-
1,1,1-TCA	11	200	200	99	2,000	2,100
cis 1,2-DCE	340	-	-	650	-	310
trans 1,2-DCE	-	-	41	2,000	-	81
Naphthalene	-	-	-	-	7,900	-
Xylenes	-	-	-	-	11,000	-

## **CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES**

### **Land Use**

Land use within the institutional control area includes industrial, commercial, agricultural, and residential uses. There are no land use activities which will be restricted as part of the Area-Wide remedy. Deed restrictions may be imposed on some subsite properties as a component of separate subsite actions.

### **Ground Water Use**

The ground water within the institutional control area has been designated as a Class GA Ground Water Supply by the state of Nebraska. A Class GA Ground Water is a ground water supply which is currently being used as a public drinking water supply or is proposed to be used as a public drinking water supply.

Contamination associated with the HGWCS subsites has caused the state to designate the site as a Remedial Action Class 1 (RAC-1) incident requiring "the most extensive remedial action measures" to clean up the ground water to drinking water quality and suitable for all other beneficial uses.

The city of Hastings has enacted an ordinance to restrict use of contaminated ground water for potable water purposes. These actions are necessary in order to minimize the threat to human health until such time as the project goals (i.e., MCLs) are achieved.

The selected actions are necessary in order to ensure that the contaminated ground water is cleaned up and returned to full beneficial use within an acceptable time frame. Nebraska Title 118 states that the time frame for required action (including cleanup) will be the period of potential exposure to the contamination in the absence of any remedial action or 20 years, whichever is less. On a case-by-case basis, a longer period of time may be allowed if adequately justified by the responsible party.

## **SUMMARY OF SUBSITE RISKS**

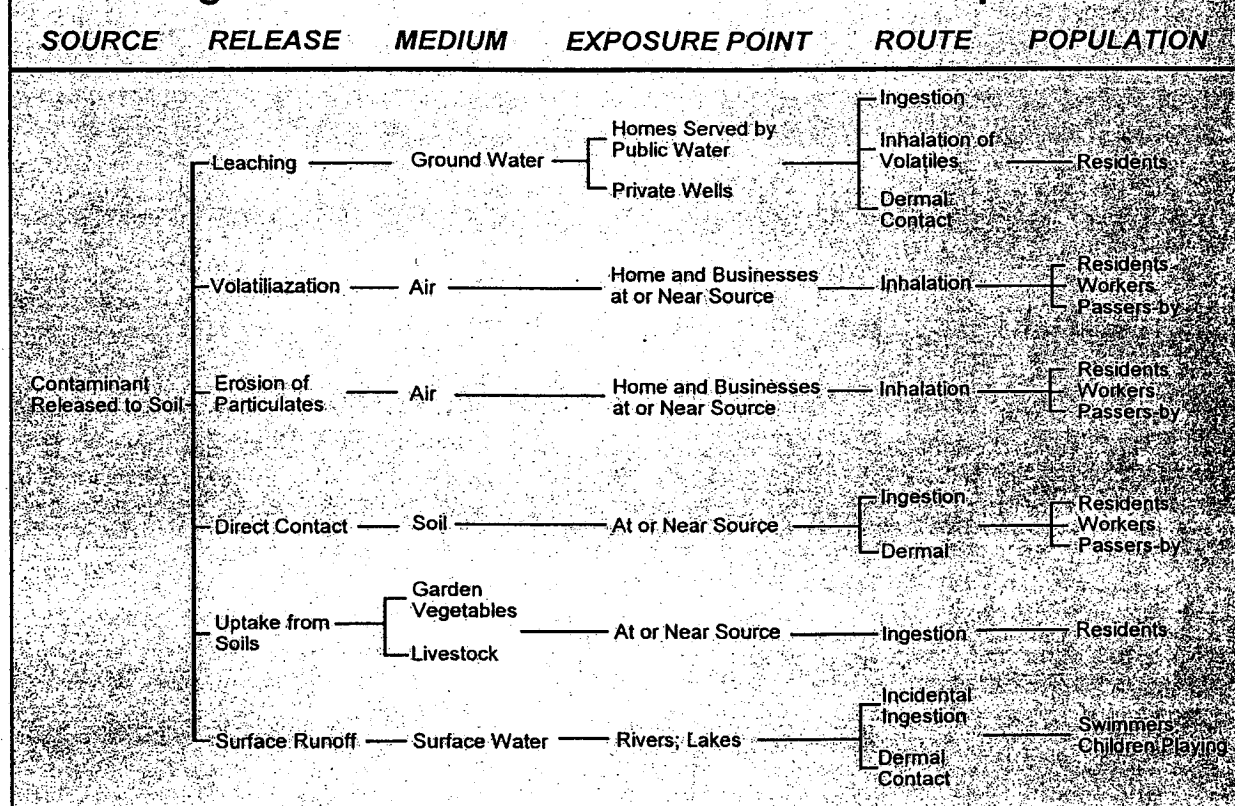
The Conceptual Site Model (CSM) for the contaminant released to soils at the Site is provided in Figure 8. The CSM is a three-dimensional "picture" of site conditions that illustrates contaminant sources, release mechanisms, exposure pathways, migration routes, and potential human and ecological receptors. It documents current and anticipates future site conditions and shows what is known about human and environmental exposure through contaminant release and migration to potential receptors. The risk assessment and response action for the HGWCS is based on this CSM.

A baseline risk assessment was prepared by the Nebraska Health and Human Services System for the HGWCS, dated November 1997. This assessment evaluates the potential area-wide risk associated with hypothetical human exposure to residual ground water concentrations after the interim remedial/removal actions have been completed at each of the subsites.

Four hypothetical receptors were selected to quantify the risk associated with the Reasonable Maximum Exposure (RME, the highest exposure that is reasonably expected to occur) at the site. Receptor #1 is located down gradient of (in the path of the migrating ground water contamination) the Well No. 3 Subsite. Receptor #2 is located down gradient of the Colorado Avenue Subsite and the Second Street Subsite. Receptor #3 is located down gradient of the North Landfill Subsite and the FAR-MAR-CO Subsite. Receptor #4 is located down gradient of the South Landfill Subsite. It was assumed that an adult and a child resident at each of these locations will be exposed to all of the COCs by inhalation of the contaminated ground water while showering/tub-bathing and by ingestion. This assumption is extremely conservative given that ground water from within the defined limits of the HGWCS is currently not used.

Both non-carcinogenic and carcinogenic risk associated with exposure to contaminated ground water is quantified in this risk assessment. This quantification is made by comparing a hypothetical exposure rate (or intake) of a chemical to a chemical-specific toxicity value provided

**Figure 8. Potential Sources of Human Exposure**



by the EPA. For non-carcinogenic effects, a hazard index greater than 1.0 indicates the possibility that adverse health effects may occur. For carcinogenic effects, remedial action is generally required at a site when the excess cancer risk level exceeds 1 in 10,000 ( $1 \times 10^{-4}$ ). The risk determinations are summarized in Table 8. This assessment indicates that non-carcinogenic risks for the four receptors are all greater than 1.0; therefore, the potential for adverse health effects exists. Based on the conservative exposure scenarios used in the assessment, all four receptors indicate carcinogenic risks in excess of  $1 \times 10^{-4}$ .

Pursuant to the authority of the Safe Drinking Water Act, 42 U.S.C. Section 300(g), the EPA has established MCLs for many chemical contaminants. MCLs refer to the maximum permissible level of contaminant in water which is delivered to any user of a public water system. MCLs are based on health risk, treatment technology, cost, and analytical methods and are used in developing ground water cleanup levels.

The MCL established for EDB is 0.05  $\mu\text{g/l}$ ; the MCL for cis-1,2-DCE is 0.07  $\mu\text{g/l}$ ; the MCL for trans-1,2-DCE is 0.1  $\mu\text{g/l}$ ; the MCL for VC is 2  $\mu\text{g/l}$ ; the MCL for benzene,  $\text{CCl}_4$ , 1,2-DCA, methylene chloride, PCE, and TCE is 5  $\mu\text{g/l}$ ; the MCL for 1,1-DCE is 7  $\mu\text{g/l}$ . The ground water aquifer beneath the Hastings subsites has concentrations of these contaminants far above the MCLs. MCL exceedances have prompted the EPA to consider institutional controls to reduce the

<b>Table 3.</b> <b>Summary of Human Health Risk Assessment</b>				
Health Risk	Receptor #1	Receptor #2	Receptor #3	Receptor #4
	Well No. 3 Subsite	Colorado Avenue and Second Street Subsites	North Landfill and FAR-MAR-CO Subsites	South Landfill Subsite
Non-Carcinogenic Residential Risk (Hazard Index), Child	14.2	56.3	31.1	3.8
Non-Carcinogenic Residential Risk (Hazard Index), Adult	5.7	22.5	12.9	1.6
Carcinogenic Residential Risk, Child	$4.68 \times 10^{-4}$	$4.31 \times 10^{-4}$	$7.70 \times 10^{-4}$	$9.08 \times 10^{-5}$
Carcinogenic Residential Risk, Adult	$4.68 \times 10^{-4}$	$8.50 \times 10^{-4}$	$1.22 \times 10^{-3}$	$1.74 \times 10^{-4}$

<b>Table 4.</b> <b>Risk-Based Concentrations and Maximum Contaminant Levels for Contaminants of Concern</b>					
Contaminant of Concern	<i>Drinking Water Standards and Health Advisories, EPA 822-B-00-001, Summer 2000</i>				
	Standards		Health Advisories		
	MCLG (µg/l)	MCL (µg/l)	Lifetime (non-cancer) (µg/l)	$1 \times 10^{-4}$ Cancer Risk (µg/l)	$1 \times 10^{-6}$ Cancer Risk (µg/l)
Benzene	zero	5	-	100	1
CCl <sub>4</sub>	zero	5	-	30	0.3
Chloroform	zero	80	-	600	6
1,2-DCA	zero	5	-	40	0.4
1,1-DCE	7	7	7	-	-
Methylene Chloride	zero	5	-	500	5
Styrene	100	100	100	-	-
PCE	zero	5	10	-	-
TCE	zero	5	-	200	2
VC	zero	2	-	2	.02
EDB	zero	0.05	-	0.05	0.0005
1,1,1-TCA	200	200	200	-	-
cis 1,2-DCE	70	70	70	-	-
trans 1,2-DCE	100	100	100	-	-
Naphthalene	100	-	-	-	-
Benzo(a)pyrene	zero	0.2	-	2	0.02

Table 5. Summary of Chemical Toxicity Data		
Compound	Toxicity	
	Short Term	Long Term
	The EPA has determined that this chemical has the potential to cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time:	The EPA has determined that this chemical has the potential to cause the following effects from a lifetime exposure at levels above the MCL:
Benzene	temporary nervous system disorders, immune system depression, anemia.	chromosome aberrations, cancer.
Carbon Tetrachloride	liver, kidney and lung damage.	liver damage; cancer.
1,2-Dichloroethane	central nervous system disorders, and adverse lung, kidney, liver circulatory and gastrointestinal effects.	cancer.
1,1-Dichloroethylene	The EPA has not classified DCE (cis and trans) as a human carcinogen (Group D). Acute exposure to DCE will have similar effects as acute exposure to TCE.	
Ethylene Dibromide	damage to the liver, stomach, and adrenal glands, along with significant reproductive system toxicity, particularly the testes.	damage to the respiratory system, nervous system, liver, heart, and kidneys; cancer.
Methylene Chloride	damage to the nervous system and to blood.	liver damage; cancer.
Tetrachloroethylene	The EPA has determined that some people who drink water containing tetrachloroethylene in excess of the MCL over many years could have problems with their liver and may have an increased risk of getting cancer.	
Trichloroethylene	The EPA has determined that some people who drink water containing trichloroethylene in excess of the MCL over many years could experience problems with their liver and may have an increased risk of getting cancer.	
Styrene	nervous system effects such as depression, loss of concentration, weakness, fatigue and nausea.	liver and nerve tissue damage; cancer.
1,1,1-Trichloroethane	damage to the liver, nervous system and circulatory system.	liver, nervous system and circulatory system damage.
cis- and trans-1,2-Dichloroethylene	central nervous system depression.	Both cis- and trans-1,2-DCE have the potential to cause liver, circulatory and nervous system damage from long-term exposure at levels above the MCL. The trans form is approximately twice as potent as the cis form in its ability to depress the central nervous system.
Vinyl Chloride	damage to the nervous system.	damage to the liver and nervous system; cancer.

risk levels while final cleanup remedies are implemented. Table 4 lists the MCL concentrations for the COCs. Table 5 summarizes some of the available toxicity information for the COCs. For a more detailed description of the risk evaluation, refer to the baseline risk assessment which is contained in the Administrative Record.

### **Ecological Risk Assessment:**

There are no unacceptable ecological exposures occurring through the ground water pathway. No sensitive ecosystems have been identified in the aquifer matrix.

### **Basis for Response Action:**

The baseline human health assessment concluded that actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment. That conclusion was based on the finding that both a child and an adult potentially exposed to contaminants of concern in the ground water via ingestion and inhalation pathways could face unacceptable human health risks. Therefore, the selected response action will continue to address the residual contamination present in the aquifer until MCLs are attained and verified. The MCLs are listed in Table 4. For a more detailed description of risk to human health and the environment, refer to the Baseline Risk Assessment which is contained in the Administrative Record.

### **REMEDIAL ACTION OBJECTIVES**

As a preparatory step to developing and evaluating remedial alternatives, the objectives and requirements of remediation are evaluated. Remedial Action Objectives (RAOs) are general descriptions of the goals established for protecting human health and the environment, to be accomplished through remedial actions. The Remedial Investigation (RI) and baseline risk assessment have identified the medium of concern (ground water), chemicals of potential concern, acceptable chemical concentrations for protecting human health and the environment, potential exposure routes, and potential receptors. Based on this information, site-specific RAOs were developed to establish the ground water remediation goals for the Area-Wide Action. The RAOs for the HGWCS Area-Wide Action are summarized in Table 6 and are in accordance with the requirements of CERCLA and the NCP. CERCLA and the NCP mandate several overall objectives for remedial activities, including the goal of attaining "...a degree of cleanup of hazardous substances, pollutants, and contaminants released into the environment and of control of further release, at a minimum, which assures the protection of human health and the environment."

**Table 6.**  
**Remedial Action Objectives (RAOs) for the Area-Wide Action**

- ▶ Prevent the ingestion of ground water that exceeds MCLs, or the  $1 \times 10^{-6}$  excess cancer risk level
- ▶ Provide containment of ground water that exceeds the MCL or  $1 \times 10^{-6}$  target cleanup goals to protect against further degradation of the ground water
- ▶ Reduce the mass of contaminants within the ground water containment area
- ▶ Restore the aquifer to full beneficial use within a reasonable time frame

## DESCRIPTION OF ALTERNATIVES

Table 7 summarizes the interim and final removal and remedial actions underway or planned for the six city subsites. As the Table indicates, response actions to achieve MCLs or  $1 \times 10^{-6}$  risk levels in the ground water are in place at part of the Well No. 3 Subsite for TCE and at the FAR-MAR-CO Subsite. The FAR-MAR-CO action may achieve a  $1 \times 10^{-6}$  risk level for TCE in the ground water at the North Landfill Subsite also. If not, a future North Landfill subsite action will be implemented. The EPA has selected a final remedy to achieve a  $1 \times 10^{-6}$  risk level in the ground water at the South Landfill. Final remedies have not been identified for either the Second Street Subsite or the Colorado Avenue Subsite. This Proposed Plan summarizes the evaluation of remedial alternatives available to meet the RAOs.

<b>Table 7.</b> <b>Summary of Hastings Subsite Interim and Final Remedial Actions</b>		
<b>Subsite</b>	<b>Interim Remedial Action</b>	<b>Final Remedial Action</b>
Well No. 3	Interim Action ROD for Well No. 3 to achieve MCLs for Plume 1 and $1 \times 10^{-4}$ risk levels for Plume 2.	Planned Final ROD for Well No. 3 will select an action to achieve MCLs for Plume 2.
Colorado Ave	Interim Action ROD for Colorado Avenue to achieve $1 \times 10^{-4}$ risk levels.	Planned Final ROD for Colorado Avenue will select actions to achieve MCLs.
Second Street	Removal Action for Second Street to achieve $1 \times 10^{-4}$ risk levels for benzene.	Planned Final ROD for Second Street will select actions to achieve MCLs.
South Landfill	No Interim Actions performed.	Final ROD (9/28/00) selected action to achieve MCLs.
North Landfill	Interim Action ROD for North Landfill to achieve $1 \times 10^{-4}$ risk levels for TCE, 1,2-DCE, and VC.	Planned Final ROD for North Landfill will select action to achieve MCLs.
FAR-MAR-CO	Removal Order for FAR-MAR-CO to achieve MCL for TCE.	Planned Final ROD for FAR-MAR-CO will select actions to achieve MCLs for all COCs.

The technologies (i.e. Process Options) that were retained for detailed evaluation in the FS were assembled into the four remedial alternatives identified in Table 8 to address specific concerns of ground water at the HGWCS. The alternatives mirror the alternatives evaluated in the FS and Addendum. The four remedial alternatives include components of various collection, treatment, and discharge technologies/process options. It was only through an evaluation of all four alternatives that EPA determined that a final remedy could not be implemented at this time. The discussion of all four alternatives that follows provides the basis for EPA's conclusion to select an interim action remedy.

These selected ground water alternatives blend various elements of ground water remedial actions to address the specific conditions at the HGWCS. An evaluation of a "No Action" Alternative is required by regulation.



**Table 8.**  
**Remedial Alternatives for Ground Water**

G-1	No Action
G-2	Institutional Control Actions
G-3	Hydraulic Containment, Institutional Control Actions, Limited Subsite Actions to $1 \times 10^{-4}$ risk levels
G-4	Hydraulic Containment, Institutional Control Area, Continued Subsite Actions to MCLs

In January 2001, the city of Hastings enacted an ordinance establishing an institutional control area (ICA) (Ordinance #3754) and requiring ground water use restrictions and a registration process for private wells within the Hastings Superfund Ground Water Control Area. The ICA control measures are included with Remedial Alternatives G-2, G-3, and G-4, and are considered necessary to eliminate potential risk.

#### **Alternatives G-1: No Action**

<i>Estimated Capital Cost:</i>	<i>\$0</i>
<i>Estimated Annual O&amp;M:</i>	<i>\$0</i>
<i>Estimated Present Worth:</i>	<i>\$0</i>

Regulations governing the Superfund program require that the No Action alternative be evaluated at every site to establish a baseline for comparison. Under the No Action alternative, the EPA would take no action at the Area-Wide OU to prevent exposure to the contaminated ground water. Subsite actions would continue in accordance with subsite decision documents. It is recognized that the city has passed an ordinance to limit use of contaminated water. Costs to implement the ordinance are not included as this would not be implemented as an EPA action. Implementation of City Ordinance #3754 should prevent some exposure to the contaminated ground water, but without a comprehensive monitoring plan and a complete well inventory, the potential for exposure to contaminated ground water remains.

#### **Alternative G-2: Institutional Control Actions and Related Actions**

<i>Estimated Capital Cost:</i>	<i>\$267,030</i>
<i>Estimated Annual O&amp;M:</i>	<i>\$34,960/yr</i>
<i>Estimated Present Worth:</i>	<i>\$700,849</i>

Institutional Controls refer to non-engineering measures intended to affect human activities in such a way as to prevent or reduce exposure to hazardous substances. The institutional controls and related actions will include:

- Domestic ground water use restrictions to prevent the installation of drinking water wells in the contaminated area. The ground water use restrictions would preclude current or future property owners from pumping ground water for domestic use until it is demonstrated

through sampling that the ground water is suitable for use. This measure reduces the human exposure pathway to impacted ground water. This would be accomplished through implementation of City Ordinance #3754;

- ▶ Installation of warning signs to advise the public that the water in the area may not meet public drinking water standards (this is likewise a component of City Ordinance #3754);
- ▶ Monitoring compliance with ground water use restrictions to prevent unacceptable exposures (this is also a component of City Ordinance #3754);
- ▶ An inventory of all existing ground water wells to identify all domestic, irrigation, industrial and monitoring wells in the institutional control area (ICA). The inventory will identify users of existing wells who are potentially at risk and which will be targeted for future monitoring.
- ▶ Providing an alternate source of water for domestic use to any residences currently relying on private wells within the ICA that are impacted by contamination attributable to the HGWCS. These activities may include funding the hook-up to the city's public water supply system, or providing bottled water and/or an in-house treatment system for the well water.
- ▶ A ground water monitoring program which will include periodic ground water sampling of selected wells identified in the areas of contamination and down gradient from the contamination zones. The monitoring program will be designed to identify the extent of the plumes and down gradient water users who may be at risk. The installation of additional monitoring wells may be required as part of the ground water monitoring system.
- ▶ Preparation of an annual report which summarizes the activities occurring under the new ordinance, compiles all the monitoring data collected, evaluates the effectiveness of plume containment measures, evaluates the ordinance for its effectiveness in preventing exposure, and evaluates the need for additional city actions (i.e., additional monitoring wells or alternative water supplies) to control unacceptable exposures.

The estimated capital cost for Alternative G-2 includes the administrative costs to set up the ICA, installation of monitoring wells, as necessary, completing the inventory of wells within the ICA, and collecting the initial round of water samples. Annual O&M costs include the cost to conduct regular inspections, sign maintenance, annual sampling, alternative water supplies, and monitoring compliance with the City Ordinance #3754. These costs do not include costs for individual subsite actions which will be implemented under separate subsite RODs.

**Alternative G-3:      Hydraulic Containment, Institutional Control Area, Limited Subsite Actions (Cleanup Goal is  $1 \times 10^{-4}$ )**

<i>Estimated Capital Cost:</i>	<i>\$1,095,512</i>
<i>Estimated Annual O&amp;M:</i>	<i>\$869,982/yr</i>
<i>Estimated Present Worth:</i>	<i>\$6,269,551</i>

Alternative G-3 includes all the components of Alternative G-2, plus the following:

- ▶ Hydraulic containment of ground water to MCLs, through operation of extraction wells, i.e., continued operation of Well D and industrial wells operated by Chief Ethanol and the Whelan Energy Center.
- ▶ Beneficial reuse of ground water pumped from extraction wells as non-contact cooling water at the Hastings Energy Center.
- ▶ Continuation of remedial actions at subsites until  $1 \times 10^{-4}$  cleanup levels are achieved.

Water quality data collected as part of the ground water monitoring program will be used to evaluate the effectiveness of the containment system and included in the annual report described under Alternative G-2.

**Alternative G-4:      Hydraulic Containment, Institutional Control Area, Continued Subsite Actions (Cleanup Goal is MCLs)**

<i>Estimated Capital Cost:</i>	<b>\$2,879,812</b>
<i>Estimated Annual O&amp;M:</i>	<b>\$890,982/yr</b>
<i>Estimated Present Worth:</i>	<b>\$9,959,778</b>

Alternative G-4 includes all the components of Alternative G-2, plus the following:

- ▶ Operation of subsite actions to achieve MCLs or  $1 \times 10^{-6}$  risk levels.

## **COMPARATIVE ANALYSIS OF ALTERNATIVES**

Nine criteria are used to evaluate the different remediation alternatives individually and against each other in order to select a remedy. The nine evaluation criteria are (1) overall protection of human health and the environment; (2) compliance with Applicable, Relevant and Appropriate requirements (ARARs); (3) long-term effectiveness and permanence; (4) reduction of toxicity, mobility, or volume of contaminants through treatment; (5) short-term effectiveness; (6) implementability; (7) cost; (8) state/support agency acceptance; and (9) community acceptance.

This discussion profiles the relative performance of each alternative against the nine criteria, noting how it compares to the other options under consideration. The nine evaluation criteria are discussed below. The "Detailed Analysis of Alternatives" can be found in the FS Report and FS Addendum.

1. **Overall Protection of Human Health and the Environment** *determines whether an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.*

All of the alternatives except the "No Action" alternative provide increased protection of human health and the environment by eliminating, reducing, or controlling risk by one or more of the following: through treatment, engineering controls, or institutional controls and related actions.

Alternative G-4 provides the greatest overall protection because it would achieve MCLs or  $1 \times 10^{-6}$  risk levels as cleanup goals at all of the subsites. Additional protection is provided in all alternatives by restricting domestic ground water use which will protect receptors from exposure to ground water, and hydraulic containment is designed to capture all potentially impacted area-wide ground water that exceeds the  $1 \times 10^{-4}$  risk levels before it leaves the subsites.

Alternative G-3 provides a lower degree of protection than Alternative G-4 because subsite actions will be performed only until  $1 \times 10^{-4}$  risk levels are achieved. Beyond this point, G-3 relies solely on institutional controls and related actions to protect receptors from exposure to contaminated ground water above MCLs.

Because the "No Action" alternative (G-1) is not protective of human health and the environment, it is eliminated from consideration under the remaining eight criteria.

2. **Compliance with ARARs** *evaluates whether the alternative meets federal and state environmental statutes, regulations, and other requirements that pertain to the site or whether a waiver is justified.*

The current objective of the remedial ground water actions at the subsites varies from containment of ground water that exceeds an excess cancer risk level of  $1 \times 10^{-4}$  at Colorado Avenue and Second Street, to attainment of MCLs at Well No. 3, FAR-MAR-CO, South Landfill, and possibly North Landfill for TCE.

NDEQ has identified MCLs as the chemical-specific ARARs for the final Area-Wide ground water remedy. Nebraska Title 118 Ground Water Quality Standards and Use Classification requires that MCLs be achieved within a 20-year time frame. The FS identifies other ARARs such as state regulations concerning ground water monitoring, the local ordinance, concerning well registration. Alternatives G-2, G-3 and G-4 are all equally compliant for Location-Specific and Action-Specific ARAR requirements. A difference exists with regard to the Chemical-Specific ARAR – achieving MCLs.

Alternatives G-2 and G-3 are not ARAR compliant because they do not set MCLs as the cleanup goal. ARAR compliance with Alternative G-4 can not be determined because there is insufficient data to conclude that MCLs can be achieved at this time at the Colorado Avenue and Second Street Subsites and at North Landfill Subsite (through the FAR-MAR-CO action). The EPA will conduct periodic monitoring of ongoing subsite actions to determine progress towards achieving MCLs in accordance with subsite-specific RODs. Since none of the alternatives achieves ARARs, the Area-Wide remedy must be implemented as an interim action, consistent with the 40 C.F.R. 300.430(f)(1)(ii)(C).

If monitoring determines that achievement of the chemical-specific ARARs is impracticable because of site conditions, then an ARAR waiver may be appropriate as a subsite action and may be requested in accordance with Section 121 (d)(4) of CERCLA which states that an ARAR waiver may be granted if "compliance with the ARAR is technically impracticable from an engineering perspective."

3. **Long-term Effectiveness and Permanence** *considers the ability of an alternative to maintain protection of human health and the environment over time.*

The institutional controls and related actions established under Alternatives G-2, G-3, and G-4 are measures that would restrict use of ground water that exceeds health-based standards until MCLs are reached at all subsites. The long-term effectiveness of Alternative G-4 would be greater than Alternative G-3 because active subsite actions would be continued beyond  $1 \times 10^{-4}$  risk level. The long-term effectiveness of Alternative G-4 would be greater than Alternative G-2 because active subsite actions would not be conducted as part of Alternative G-2.

4. **Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment** *evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.*

Alternative G-4 offers the greatest reduction of toxicity and volume, due to the operation of containment wells and remedial measures at all subsites. The hydraulic containment achieved through subsite actions reduces toxicity and volume, and in capturing the impacted ground water, both alternatives remove the contaminants and reduce mobility. Alternative G-3 is less successful in this category because it does not assume continued subsite actions beyond  $1 \times 10^{-4}$  risk level. Alternative G-2 does not reduce toxicity, mobility, or volume of contaminants because active subsite actions would not be conducted as part of Alternative G-2.

5. **Short-term Effectiveness** *considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation.*

In evaluating short-term effectiveness, the negative drawbacks of an option, including hazards incurred due to the implementation of a remedy, are considered to assist in a cost/benefit assessment.

The short-term impacts to public health and the environment are minimal for each of the alternatives evaluated, since the major elements of each alternative are already in place.

6. **Implementability** *considers the technical and administrative feasibility of implementing the alternative such as relative availability of goods and services.*

The implementability criterion addresses the technical and administrative feasibility of an alternative. Technical implementability is more easily assessed, based on the required level and

difficulty of remedial action. Technical implementability is concerned with construction, operation, reliability, and monitoring considerations associated with a particular alternative.

Administrative implementability addresses whether an alternative can be implemented in the context of federal, state, and local laws and regulations. In this respect, the "implementability" of the alternatives with respect to the NCP is a critical evaluation criteria for the Area-Wide remedy as discussed below.

Alternative G-4 is not implementable at this time because there is insufficient data about the final subsite actions to achieve MCLs, specifically, the technology, the duration of the remedy, and the costs associated with it at all the subsites.

Alternative G-3 may be implementable but questions still remain about the ability to achieve  $1 \times 10^{-4}$  at all the subsites. Alternative G-2 is implementable but it does not meet ARARs (MCLs).

7. *Cost includes changes to the alternative cost estimates and the new estimated capital, O&M and Present Worth costs. Present worth cost is the total cost of an alternative over time in terms of year 2000 dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.*

Tables 9, 10, 11, 12, and 13 summarize the cost estimates for the four remedial alternatives evaluated in detail. These totals reflect changes made to the alternative cost estimates since the Proposed Plan was issued. Changes in the estimated costs were made based on PRP comments to the Proposed Plan and a change in the present worth discount rate. The PRPs' comments and the changes made in response to them are discussed in further detail in the Responsiveness Summary included as an Attachment to this ROD.

EPA's guidance regarding the calculation of present worth costs ("*Revisions to OMB Circular A-94 on Guidelines and Discount Rates for Benefit-Cost Analysis*", OSWER Directive No. 9355.3-20, June 25, 1993), recommends the use of a 7% discount rate for the calculation of present worth value, rather than the 5% used in the FS and reflected in the Proposed Plan cost estimate tables (Tables 7, 8, 9, and 10). Use of the recommended 7% discount rate lowers the estimate of the present worth of annual O&M, and thus total project cost, due to the use of smaller present worth factors (i.e. the 30-year, 7% present worth factor is 12.409X versus the 30-year, 5% present worth factor of 15.372X).

The following summarizes the changes/corrections made to the alternative cost estimates presented in Tables 9, 10, 11, and 12:

- ▶ Alternative G-2      Total Present Worth Cost reduced from \$804,435 to \$700,848, a reduction of 13%, due to the use of the 7% discount rate.
- ▶ Alternative G-3      Total Present Worth reduced from \$6,839,391 to \$6,269,551, a reduction of 8%, due primarily to the use of the 7% discount rate.

- **Alternative G-4** Total Present Worth reduced from \$12,872,120 to \$9,959,778, a reduction of 23%, due to correction of the South Landfill Subsite costs (-\$1,892,300) and use of the 7% discount rate.

The changes to the alternative cost estimates do not change the evaluation or ranking of the alternatives relative to EPA's remedy selection criteria. Furthermore, because these changes/corrections result in revised total project costs which fall within EPA's expected accuracy range of -30 to +50 percent, the revised costs presented in the ROD are not considered to be a significant change from the Proposed Plan. Detailed cost estimates presented in the FS and FS Addendum are provided in Appendix D of this ROD. The present value cost represents the equivalent value in 2000 dollars.

The highest costs are associated with Alternative G-4, which assumes that MCLs will be achieved at all city subsites under the Area-Wide remedy. Alternative G-3 has the next highest cost. Alternative G-3 assumes that subsite actions will continue until  $1 \times 10^{-4}$  risk levels are achieved under the Area-Wide remedy. Alternative G-2 is the least costly because it is limited to the costs associated with institutional controls and related actions. The detailed elements, including all assumptions of capital and O&M costs for each alternative, are included in the FS and FS Addendum.

Table 9 Revised Summary of Alternative G-2 Costs								
Component	Capital Cost	O&M	O&M Present Worth	Capital Cost	O&M	O&M Present Worth	Cost	%
	@ 5% discount rate <sup>1</sup>			@ 7% discount rate <sup>2</sup>			Difference	
1. Institutional Control Actions								
ICA Activities (30 yrs)	\$267,030	\$34,960	\$537,405	\$267,030	\$34,960	\$433,819	(\$103,586)	-13%
Subtotal			\$804,435			\$700,849		
Costs include contingencies (10%), project management (5%), and administrative costs.								
1 5% discount rate was used in the FS and FS Addendum								
2. EPA guidance, "Revisions to OMB Circular A-94 on Guidelines and Discount Rates for Benefit-Cost Analysis", OSWER Directive No. 9355.3-20, June 25, 1993, recommends the use of a 7% discount rate								

8. **State/Support Agency Acceptance** *consider whether the state agrees with the EPA's analyses and recommendations of the RI/FS and the Proposed Plan.*

The state believes that the institutional controls and other related actions specific under Alternative G-2 will minimize the threat of human exposure to the ground water contamination while the effectiveness of subsite actions are being evaluated as a mechanism to restore the aquifer to the MCLs in an acceptable time frame. The state believes the subsite actions should be continued until MCLs are achieved. The state will seek reevaluation of the remedy selected in the interim action ROD should it fail to achieve the desired goals.

**Table 10**  
**Revised Summary of Alternative G-3 Costs**  
**(Subsite Actions to achieve  $1 \times 10^{-4}$  risk levels)**

Component	Capital Cost	O&M	O&M Present Worth	Capital Cost	O&M	O&M Present Worth	Cost	%
	@ 5% discount rate <sup>1</sup>			@ 7% discount rate <sup>2</sup>			Difference	
1. Institutional Controls and Related Actions								
ICA Activities (30 yrs)	\$267,030	\$34,960	\$537,405	\$267,030	\$34,960	\$433,819	(\$103,586)	-13%
Subtotal			\$804,435			\$700,849		
2. FAR MAR CO Subsite Action								
O&M (30 yrs)	\$42,000	\$96,390	\$1,481,707	\$42,000	\$96,390	\$1,196,104	(\$285,603)	-19%
Subtotal			\$1,523,707			\$1,238,104		
3. Well No. 3 Subsite Action								
O&M + Closure (3 yrs)	\$0	\$96,685	\$263,273	\$0	\$96,685	\$253,701	(\$9,572)	-5%
Subtotal			\$263,273			\$253,701		
4. Second Street Subsite Action								
Removal #1(5 yrs) <sup>3</sup>	\$0	\$150,000	\$649,350	\$0	\$157,500	\$645,750	(\$8,847)	0%
Bldg. Maint. (5 yrs) <sup>3</sup>	\$0	\$118,640	\$513,593	\$0	\$124,572	\$510,745		
Removal #2 (5 yrs) <sup>3</sup>	\$0	\$150,000	\$648,150	\$0	\$157,500	\$645,750		
Subtotal			\$1,811,093			\$1,802,245		
5. Colorado Avenue Subsite Action								
Phase III (10 yrs)	\$678,482	\$170,375	\$1,315,636	\$678,482	\$170,375	\$1,196,714	(\$118,922)	-6%
Subtotal			\$1,994,118			\$1,875,196		
6. South Landfill Subsite Actions								
GW Monitoring	\$108,000	\$32,000	\$332,160	\$108,000	\$32,000	\$291,456	(\$40,704)	-9%
Subtotal			\$440,160			\$399,456		
Alt. G-3 Subtotals	\$1,095,512	\$849,050	\$5,741,274	\$1,095,512	\$869,982	\$5,174,039		
Alternative G-3 Total Present Worth Cost			\$6,836,786			\$6,269,551	(\$567,235)	-8%

Costs include contingencies (varies from 5%-20%), project management (varies from 5%-15%), and administrative costs.

For purposes of cost estimation, it is assumed that the North Landfill site will be addressed by the FAR-MAR-CO subsite actions and that ground water monitoring will be required at the South Landfill subsite.

1. 5% discount rate was used in the FS and FS Addendum

2. EPA guidance, "Revisions to OMB Circular A-94 on Guidelines and Discount Rates for Benefit-Cost Analysis", OSWER Directive No. 9355.3-20, June 25, 1993), recommends the use of a 7% discount rate

3. Revised costs include a 5% contingency for O&M.



**Table 11**  
**Revised Summary of Alternative G-4 Costs**  
**(Subsite Actions to achieve MCLs)**

Component	Capital Cost	O&M	O&M Present Worth	Capital Cost	O&M	O&M Present Worth	Cost	%
	@ 5% discount rate			@ 7% discount rate			Difference	
1. Institutional Controls and Related Actions								
ICA Activities (30 yrs)	\$267,030	\$34,960	\$537,405	\$267,030	\$34,960	\$433,819	(\$103,586)	-13%
Subtotal			\$804,435			\$700,849		
2. FAR MAR CO Subsite Action								
O&M (30 yrs)	\$42,000	\$96,390	\$1,481,707	\$42,000	\$96,390	\$1,196,104	(\$285,603)	-19%
Subtotal			\$1,523,707			\$1,238,104		
3. Well No. 3 Subsite Action								
O&M + Closure (5 yrs)	\$0	\$96,685	\$418,549	\$0	\$96,685	\$396,408	(\$22,141)	-5%
Subtotal			\$418,549			\$396,408		
4. Second Street Subsite Action								
Removal #1(5 yrs)	\$0	\$150,000	\$649,350	\$0	\$157,500	\$645,750	(\$128,938)	-5%
Bldg. Maint. (5 yrs)	\$0	\$118,640	\$513,593	\$0	\$124,572	\$510,745		
Removal #2 (15 yrs)	\$0	\$150,000	\$1,557,000	\$0	\$157,500	\$1,434,510		
Subtotal			\$2,719,943			\$2,591,005		
5. Colorado Avenue Subsite Action								
Phase III (20 yrs)	\$678,482	\$170,375	\$2,123,213	\$678,482	\$170,375	\$1,804,953	(\$318,260)	-11%
Subtotal			\$2,801,695			\$2,483,435		
6. South Landfill Subsite Actions								
Landfill Cap	\$1,784,300	\$21,000	\$322,812	\$1,784,300	\$21,000	\$260,589	(\$155,798)	-6%
GW Monitoring	\$108,000	\$32,000	\$491,904	\$108,000	\$32,000	\$397,088		
Subtotal	\$1,892,300	\$53,100	\$814,716	\$1,892,300	\$53,100	\$658,918		
Subtotal <sup>a</sup>			\$2,707,016			\$2,551,218		
Alt. G-4 Subtotals	\$2,879,812	\$870,050	\$8,095,533	\$2,879,812	\$890,982	\$7,079,966		
Alternative G-4 Total Present Worth Cost			\$10,975,345			\$9,959,778	(\$1,015,568)	-9%

Costs include contingencies (varies from 5%-20%), project management (varies from 5%-15%), and administrative costs.

For purposes of cost estimation, it is assumed that the North Landfill site will be addressed by the FAR-MAR-CO subsite actions and that ground water monitoring will be required at the South Landfill subsite.

1. 5% discount rate was used in the FS and FS Addendum

2. EPA guidance, "Revisions to OMB Circular A-94 on Guidelines and Discount Rates for Benefit-Cost Analysis", OSWER Directive No. 9355.3-20, June 25, 1993, recommends the use of a 7% discount rate

3. Revised costs include a 5% contingency for O&M.

4. Revised costs reflect correction (-\$1,892,300) in calculation of South Landfill Present Worth Costs

<p align="center"><b>Table 12</b> <b>Summary of Cost Estimates for Remedial Alternative</b></p>				
<b>Alternative #</b>	<b>Capital Cost</b>	<b>Annual O&amp;M</b>	<b>O&amp;M Present Worth</b>	<b>Total Present Worth</b>
G-1 No Action	\$0	\$0	\$0	\$0
G-2 Institutional Controls and Related Actions	\$267,030	34,960/yr	\$433,819	\$700,849
G-3 Institutional Controls w/ Limited Subsite Actions to 1 x 10 <sup>-4</sup> Risk Levels	\$1,095,512	\$869,982/yr	\$5,174,039	\$6,269,551
G-4 Institutional Controls w/ Subsite Actions to MCLs	\$2,879,812	\$890,812/yr	\$7,079,966	\$9,959,778

9. *Community Acceptance considers whether the local community agrees with the EPA's analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.*

The EPA held a public comment period to allow the community to comment on the preferred alternative as set forth in the Proposed Plan and on the other alternatives considered. A number of comments were received from representatives of the PRPs who stated that Proposed Action does not adhere to the intent of the Area-Wide FS which was to develop a final site-wide remedy for impacted ground water. EPA's position, as stated previously, is there is presently insufficient information on certain subsite remedies, making implementation of a final site-wide remedy unattainable at this time. Further information regarding public acceptance is included in the Responsiveness Summary included as an Appendix to this ROD.

Table 13 summarizes the Comparative Analysis of Alternatives with respect to the nine evaluation criteria.






### **SUMMARY OF REMEDIAL CRITERIA EVALUATION**

EPA's evaluation of the nine criteria indicate that Alternative G-4 meets many of the criteria. However, at this time Alternative G-4 is not implementable. Alternative G-3 fails to meet many significant criteria. Similarly, Alternative G-2 does not fully satisfy the criteria or meet all of the RAOs. However, Alternative G-2 provides an important mechanism to protect human health.

### **PRINCIPAL THREAT WASTES**

Principal threat wastes have been addressed by prior subsite actions which removed the source areas within the vadose zone and are addressing the most contaminated portion of the aquifer.

**Table 13.**  
**Comparative Analysis of Alternatives**

<b>Criteria: Overall Protection of Public Health and the Environment</b>			
More Protective  Less Protective			Not Protective
G-4 Institutional Controls w/ Subsite Actions to MCL Goal	G-3 Institutional Controls w/ Limited Subsite Actions to 1 x 10-4 Risk Levels	G-2 Institutional Controls and Related Actions	G-1 No Action
<b>Criteria: Compliance with ARARs</b>			
Can Not Be Determined	Not Compliant		
G-4 Institutional Controls w/ Subsite Actions to MCL Goal	G-2 Institutional Controls and Related Actions	G-3 Institutional Controls w/ Limited Subsite Actions to 1 x 10-4 Risk Levels	G-1 No Action
<b>Criteria: Long-Term Effectiveness</b>			
Most Effective  Least Effective			
G-4 Institutional Controls w/ Subsite Actions to MCL Goal	G-3 Institutional Controls w/ Limited Subsite Actions to 1 x 10-4 Risk Levels	G-2 Institutional Controls and Related Actions	G-1 No Action
<b>Criteria: Reduction of Toxicity, Mobility, or Volume of Contaminants</b>			
Most Protective  Least Protective			
G-4 Institutional Controls w/ Subsite Actions to MCL Goal	G-3 Institutional Controls w/ Limited Subsite Actions to 1 x 10-4 Risk Levels	G-2 Institutional Controls and Related Actions	G-1 No Action
<b>Criteria: Short-Term Effectiveness</b>			
Most Effective  Least Effective			
G-4 Institutional Controls w/ Subsite Actions to MCL Goal	G-3 Institutional Controls w/ Limited Subsite Actions to 1 x 10-4 Risk Levels	G-2 Institutional Controls and Related Actions	G-1 No Action
<b>Criteria: Implementability</b>			
Implementable as an Interim Action	May Be Implementable		
G-2 Institutional Controls and Related Actions	G-3 Institutional Controls w/ Limited Subsite Actions to 1 x 10-4 Risk Levels	G-4 Institutional Controls w/ Subsite Actions to MCL Goal	G-1 No Action
<b>Criteria: Cost</b>			
Least Costly  Most Costly			
G-1 No Action	G-2 Institutional Controls and Related Actions	G-3 Institutional Controls w/ Limited Subsite Actions to 1 x 10-4 Risk Levels	G-4 Institutional Controls w/ Subsite Actions to MCL Goal

## THE SELECTED REMEDY

EPA's selected remedy is Alternative G-2, Institutional Controls and Related Actions. While this remedy does not achieve all the remedial action objectives or fully satisfy ARARs, it is considered to be the most protective and implementable alternative available at this time.

The selected remedy was chosen over Alternative G-4 because G-4 is not implementable at this time due to the lack of information on certain subsite remedies. Currently, there is insufficient data to conclude that MCLs can be achieved at the Colorado Avenue, Second Street and the North Landfill Subsite (through the FAR-MAR-CO action). No final subsite action has yet been selected at Second Street. The interim remedial actions underway at Colorado Avenue have failed to contain the plume thus far and the final subsite action has not yet been determined. Additionally, the effectiveness of the FAR-MAR-CO removal action to address both the North Landfill and FAR-MAR-CO plumes has not yet been determined. Because final remedies at these subsites have yet to be identified, it is not possible to select G-4 at this time.

The selected remedy was also chosen over G-3 because G-3 is considered to be less protective as it requires cleanup only to  $1 \times 10^{-4}$ .

The selected remedy will ensure protection of human health by eliminating the potential for exposure through institutional control actions and other related actions. Implementation of institutional controls and related actions will continue until MCLs or  $1 \times 10^{-6}$  cleanup goals are reached under final subsite RODs.

## STATUTORY DETERMINATIONS

Under CERCLA §121 and the NCP, the lead agency must select remedies that are protective of human health and the environment, comply with ARARs (unless a statutory waiver is justified), are cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous wastes as a principal element and a bias against off-site disposal of untreated wastes. The following sections discuss how the selected remedy addresses these statutory requirements.

1. The Selected Remedy is Protective of Human Health and the Environment: The selected remedy will protect human health and the environment by controlling exposure to contaminated ground water. Ground water monitoring will be performed on a routine basis to ensure that unacceptable exposures do not occur while subsite actions proceed.
2. The Selected Remedy Does Not Comply with ARARs: Section 121(d)(2) of CERCLA, 42 U.S.C. § 9621 (d)(2), requires that cleanup actions conducted under CERCLA achieve a degree or level of cleanup which, at a minimum, attains any standard, requirement, criteria or limitation under any federal environmental law...or any promulgated standard, requirement, criteria or limitation

under a state environmental or facility siting law that is more stringent than any federal standard...[which] is legally applicable to the hazardous substance or pollutant or contaminant concerned or is relevant and appropriate under the circumstances of the release or threatened release of such hazardous substance or pollutant or contaminant...The identified standards, requirements, criteria or limitations thus adopted from other environmental laws, which govern on-site cleanup activities at this site, are referred to as "applicable or relevant and appropriate requirements" or ARARs.

Under Section 121(e)(1) of CERCLA, EPA is not required to obtain any federal, state, or local permits for actions conducted on-site; the Agency need only to comply with the substantive (non-administrative) requirements of the identified federal, state, and local laws. This section identifies the ARARs which will apply to the on-site cleanup activities.

The selected remedy will comply with the following ARARs, as well as additional ARARs identified in the Feasibility Study:

*Safe Drinking Water Act of 1986, as amended (SDWA)(42 U.S.C. 300 et seq.):* Primary Drinking Water Standards are established in 40 CFR Part 141. The SDWA MCLs are health-based standards for chemicals that may be found in public water supplies. The NCP requires consideration of MCLs, where they exist, as relevant and appropriate requirements for ground water cleanups when the aquifer is a current or potential source of drinking water. The MCLs for the contaminants of concern are relevant and appropriate for establishing cleanup standards to be met upon completion of the remedy. Institutional controls will not, by themselves, achieve MCL standards.

*Nebraska Ground Water Quality Standards and Use Classification: Title 118, Chapter 4:* The substantive requirements of NDEQ's Title 118 - Ground Water Quality Standards and Use Classification, Chapter 10 and Appendix A are applicable at this site because hazardous substances from wastes disposed at the Site have contaminated the ground water supply. In accordance with Title 118, Chapter 10, 001, the Ground Water Remedial Action Protocol found in Appendix A shall apply when a point source pollution event has caused or will cause, in the NDEQ's judgment, ground water pollution. Step 8 of the Protocol established a method for determining preliminary cleanup levels for the different classifications of protected ground water. The ground water in the vicinity of the Site has been designated as a Class GA Ground Water Supply by the state of Nebraska. A Class GA Ground Water is a ground water supply which is currently being used as a public drinking water supply or is proposed to be used as a public drinking water supply. Contamination detected down gradient from the Site has caused the state to designate the Site as a RAC-1 incident requiring "the most extensive remedial action measures" to clean up the ground water to drinking water quality and suitable for all other beneficial uses. As set forth in the Protocol, the cleanup level governing a RAC-1 occurrence is the achievement of MCLs or, if there is no established MCL,  $1 \times 10^{-6}$  risk level. Institutional controls will not, by themselves, achieve state MCL standards.

3. The Selected Remedy is Cost-Effective: EPA has determined that the selected remedy is cost-effective and represents a reasonable value for the money to be spent. In making this determination, the following definition was used: "A remedy shall be cost-effective if its costs are proportional to

its overall effectiveness.” [NCP §300.430(f)(1)(ii)(D)]. This was accomplished by evaluating the “overall effectiveness” of those alternatives that satisfied the threshold criteria (i.e., were both protective of human health and the environment and implementable). Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness). Overall effectiveness was then compared to costs to determine cost-effectiveness. The relationship of the overall effectiveness of this remedial alternative was determined to be proportional to its costs and hence this alternative represents a reasonable value for the money to be spent. The estimated present worth cost of the selected remedy is \$700,849. The EPA believes that the selected remedy’s additional cost for reducing the contamination in the ground water provides a significant increase in protection of human health and the environment and is cost-effective. The information in this cost estimate is based on the best available information regarding the anticipated remedial alternative. Changes in the cost elements are likely to occur as a result of new information and data collected during the operation of the remedial alternative. Major changes may be documented in the form of a memorandum in the Administrative Record file, as Explanation of Significant Differences (ESD) or a ROD amendment. This is an order-of-magnitude engineering cost estimate that is expected to be within +50 to -30 percent of the actual project costs.

4. The Selected Remedy Does Not Utilize Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable: The EPA had determined that insufficient information was available to select a remedy, or remedies, which utilize permanent solutions and treatment technologies. Implementation of final remediation actions which satisfy the statutory preference for treatment as a principal element will be addressed by separate subsite actions.

5. Five-Year Reviews of the Selected Remedy are Required: Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on site above health-based levels, a statutory review will be conducted to ensure that the remedy continues to provide adequate protection of human health and the environment within five (5) years after the initiation of the remedial actions. The EPA completed its first five-year review of the response actions at the Hastings Ground Water Contamination Site in May, 1997. The next five-year review of all the response actions at the Hastings Ground Water Contamination Site will be completed in May 2002. In addition, EPA completed an Area-Wide Feasibility Study Report which enabled EPA to develop a interim remedy for the ground water contamination within Hastings.

## **DOCUMENTATION OF NO SIGNIFICANT CHANGES**

The EPA issued a Proposed Plan identifying institutional controls and related actions as the recommended interim remedy for the Area-Wide Ground Water Action. This plan was presented to the public on March 1, 2001. The EPA reviewed the written and oral comments submitted during the public comment period. It was determined that no significant changes to the remedy, as originally identified in the Proposed Plan, were necessary.

## **STATE ROLE**

The NDEQ has reviewed the alternatives and indicated its support for the selected remedy. The state has also reviewed the Remedial Investigation, Risk Assessment and Feasibility Study to determine if the selected remedy is in compliance with applicable or relevant and appropriate State environmental laws and regulations. The state of Nebraska concurs with the selected remedy. A copy of the declaration of concurrence is attached as Appendix A.